THE

Three parts of the Principles of the Art MILITARY,

Practiſed

In the Warres of the United-Provinces, under the Conduct of His Highneſſe the Prince of ORANGE, Generall of the Army of the High, and Mighty Lords the States Generall of the United-Netherlands.

Whereof,

THE FIRST PART

Treates of the Officers belonging to a Foot Company, the ſeverall Poſtures of the *Pike* and *Muſket*, and the exerciſing of a Company, repreſented by figure, The word of Command, and Demonſtration.

THE SECOND PART

Shewes the ſeverall Offices, and duties of the Officers of the Field, from a Provoſt-Marſhall, to a Lord Generall of an Army,

As alſo,

The ſeverall formes of Battells, from the Battell of *Newport*, to the laſt Formes of Battells ſhewen before *Breda*, and *Marſen*, Anno 1637. Under the command of Prince MAURICE of bleſſed memory, and the old Prince of ORANGE that now is:

Together,

With the Order, and forme of Quartering, Encamping, and approaching in a Warre Offenſive, and Defenſive.

THE THIRD PART

Treates of eight ſeverall Peeces of Ordnance; namely, foure reinforced, and foure ſhort Drakes, with Carriages, Engines, Quadrants, Morters, Petards: As alſo, Inſtructions for Maſter-Gunners and Canonieres; With divers Inſtruments and Materialls of Warre, with their ſeverall uſes and practiſes, moſt briefly related, and lively demonſtrated by Letter and Figure.

To Conclude,

With a Liſt of all neceſſary preparations appertaining to an Army, with a Quarter for the Generall of the Ordnance, and all other Officers belonging to that traine.

Written and compoſed by Captaine Henry Hexham, *Quartermaſter to the truely honourable Coloncll, Mr.* George Goring *his Regiment in the* Low-Countreys, *for the lovers of this noble Art* Military.

LONDON,

Printed for *Humphrey Moſley*, and are to bee ſould at his ſhop in *Pauls* Churchyard, at the ſigne of the Princes Armes, neere the great North doore. M.D.C.XLI.

THE

Three parts of the Principles of the Art

MILITARY.

Practised

In the Warres of the United-Provinces, under the Conduct of His Highnesse the Prince of ORANGE, Generall of the Army of the High, and Mighty Lords the States Generall of the United-Netherlands.

Whereof,

THE FIRST PART

Treates of the Officers belonging to a Foot Company, the several Postures of the Fike and Musket, and the exercising of a Company, represented by figure, The word of Command, and Demonstration.

THE SECOND PART

Shewes the Severall Offices, and duties of the Officers of the Field, from a Provost-Marshall, to a Lord Generall of an Army,

As also,

The severall Formes of Battells, from the Battell of Newport, to the last Formes of Battells shewn before Arnhem, and Wesel, Anno 1637. Under the command of Prince MAURICE of blessed memory, and the old Prince of ORANGE that now is:

Together,

The Rules, and Forme of Quartering, Encamping, and Approaching in a Warre Offensive, and Defensive.

THE THIRD PART

Shewes the severall Peeces of Ordnance; namely, Sure Cannon, and Sure Sent Shakes, with Carriages, Engines, Quarters, Missiles, Petrous, Assalts, Instructions for Master-Gunners and Opposites, With their Instruments and Materiall of Warre, with their severall Mixtures, [illegible] demonstrated by Letter and Figure.

To Conclude,

[illegible] Preparations appertaining to an Army, with a Counter for the Generall of the Ordnance, and all other Officers belonging to that Office.

[illegible] Henry Hexham, [illegible] Low-Countreys, [illegible]

LONDON,

Printed for [illegible] and are to bee sould at his shop in Lord Churchmaid, at the sign of the Princes Armes, neere the great North doore. M.D.C.XLI.

THE PRINCIPLES OF THE ART MILITARIE;

Practiſed in the VVarres of the Vnited Netherlands.

REPRESENTED BY FIGVRE, THE WORD OF COMMAND, AND DEMONSTRATION.

Compoſed by HENRY HEXHAM Quarter-Maſter to the Regiment of the Honourable Coronell GORING,

LONDON,
Printed by *M. P.* for *Matthew Symmons*, and are to bee ſold at his houſe in *Barbican*, neere the Red Croſſe. 1637.

THE

PRINCIPLES

OF THE

ART MILITARIE,

Practised in the Vaires of the

United Netherlands,

REPRESENTED BY FIGURE

THE WORD OF COMMAND,

AND DEMONSTRATION.

Composed by Henry Hexham Quarter Master of the Regiment of the Honourable Colonel Gorgeus.

LONDON,

Printed by [illegible]

Beefeld at his house in [illegible]

TO THE RIGHT HONORABLE,

AND MOST NOBLE LORD, HENRY LORD RICH of *Kensington*, Earle of *Holland*, Captaine of his Majesties Guard, and Gentleman of the Bed-chamber, Chancellor of the Vniversitie of *Cambridge*, Knight of the most noble Order of the Garter, and one of his Majesties most Honourable Privie Councell, &c.

RIGHT HONORABLE;

AMong the many Arts professed in the World, the Art Military, practised in our moderne times in the Warres of the Vnited Provinces, (the Nurcery of Souldierie) ought not to be accounted the least. What brave Generals, Chiefes, Commanders, and Souldiers of all Nations they have bred up, amongst the rest of our owne, as the famous Norrices, Sydneis, Willoughbies, Veres, Morgans, and divers other Captaines. What honorable actions, and services they have done, and performed, returning Victorious out of the Field, against a powerfull Army, and one of the greatest Potentates of Christendome, I will leave to the testimony of History. For when Mars and Art, true Valour and Policie meet together in a Chiefe, or Commander, they make a compleat Souldier. Some sixty yeares agoe, when this State was but a handfull of people, in comparison of what it is now, and had but a Towne or two in their hands, being crusht and tyrannized over by Duke D'Alva, and some other Governors; yet it pleased God, by giving his blessing upon the use of their Armes, in tract of time, to raise them to this power and greatnesse wherein they are now, and to enlarge their Bounds and Limits to that extention, as they are at this day. What brave Generals they have had out of the illustrious house of Nassaw, Prince William the Father, and his two generous Sonnes; how carefull and industrious Prince Maurice was of famous memory (the Father of Souldiers) to establish an uniforme Order and Discipline amongst us, which is also commanded and confirmed by his Highnesse, his victorious Brother our Generall, the Prince of Orange that now is, and is practised by our Chiefes and Commanders, is sufficiently known to all men of our Profession. This forme then of Exercising, commanded and approved of by these two great Captain-Generals of our Age; by the advise of some Noble Friends of mine, in all obedience to my Commanders, I will follow as neerely and as briefly as possibly I can, for the better instruction of such as are willing and desirous to follow the Warres: First, by representing a figure to the eye; and secondly by the

word

word of Command, Observation, and Demonstration, to informe the understanding and judgment. I will therefore begin this first Part with the Principles of this Art, for so much as concernes the severall Postures of the Pike and Musket, and then proceed forward to the exercising of a Companie, through the divers motions thereof, by figure, the word of Command, and Demonstration, and so goe on to the ordering of a Regiment both marching and standing, represented also by figure according to his Highnes Command, and will shut up this first Part with an Appendix, of the Lawes and Articles of our Marshall discipline, and some other dependances on the Warre, necessary for a Souldier to know. This Part marches in the Avantgard, and comes in most humble wise, to present it selfe unto your Honors gracious Patronage: But it may seeme strange unto your Lordship, that I who am a stranger, and unknowne unto you, should presume to dedicate this unto your Name: yet when I consider your noble worth, your heroicke Vertues, and which is more, a Lover of Souldiers; especially a noble Personage my Coronell (to whom I am much bound) the true Successor of the famous Veres (whom I have followed from my Youth) and their two Warlike Regiments, reduced now into one: besides, being borne in Holland in England, in that County whereof your Honour is Earle, and that every man by Nature is obliged to doe some good unto his native Countrey: these things being considered, I may challenge some excuse from your Honor for my boldnesse. Which if it be acceptable to your Lordship, then I shall thinke my labour and paines well bestowed, and your Honor shall give me further incouragement to fall on upon a Second, and a Third Part, for the Arming of a Souldier de Cap en pied.

Herewith most Noble Lord, I beseech the Lord of Hosts, to preserve You and your noble Familie long in health and prosperitie, with much encrease of Honour; Resting

Your Lordships devoted Servant,
ever to Command,

HENRY HEXHAM.

Septemb. 5. 1637. *Imprimatur*
hæc Epistola Dedicatoria.

SA: BARKER.

THE OFFICERS OF A foot company.

First, of a Captaine.

EVery company hath a *Head,* (to wit,) a Captaine, who in the *Allmaine* tongue is rightly called a *Hauptman,* a head man from the word *Haupt,* which ſignifieth a Head, and from the Latine word *caput,* from whence the name of a Captaine is derived in French, English and Dutch. For, as the Head is the principall member that governes, and rules the body, and unto which all the other members are ſubordinate: ſo likewiſe the officers, and ſouldiers of a company, ought to governe, and carry themſelves, according to the charge and command of their Captaine.

A Captaine then having ſo honorable a place, as to be the chiefe of a company, ought to be very capable of his charge, and as he ought to carry himſelfe with auſterity, & gravity in the point of his command, that he may be obeyed, feared, and reſpected of his ſouldiers: ſo ſhould hee alſo carry him ſelfe towards them, as a loving and kind father (ſeing they muſt live and dye together) in paying them duely, in helping, and relieving them in their wants, neceſſities, and ſickneſſes, neither muſt he be given to covetouſneſſe in keeping backe from them that which is their due.

And as he is to love, countenance, and to make much of ſuch ſouldiers of his company, as carry themſelves bravely and ſtoutly in the face of their enemy which deſerve well, ſeeking by all meanes to advance ſuch, it will give encouragement to others to do the like: ſo ought he alſo to punish vice ſeverely, quarrellers, and offenders, for the good and exſample of others.

A Captaine ſhould alſo be religious, loyall to his Prince & country, that he ſerves, juſt, temperate, liberall, wiſe and diſcreet, valliant in the field before the face of his enemy: valliant in townes and forts beſieged, and for his honour, never to give conſent in yeelding up any place, till it be paſt reliefe, and that there is no poſſibility to hold it any longer.

A Captaine alſo ought to inſtruct, & informe his ſouldiers in the point of their duties, to traine them up, and to excerciſe them well in the uſe of their armes, aſwell himſelfe as the officers that are under him, and to ſee that they readily obey, and execute his commands, which is the life of warre, and one of the principall things, required both in a Captaine and a ſouldier.

Secondly, of a Lieutenant.

FIrſt, it may be demanded, why a *Lieutenant* is ſo called, and the reaſon wherefore this name is giuen him. A *Lieutenant* then is a French word, compounded of *Lieu* a place, and *tenant* the participle of the preſent tenſe,

which ſignifieth in English, *holding*, or *keeping*, from whence he taketh his name, and is as much, as if one should ſay, a *Lieutenant* is he, which holdeth up, and ſupplieth the place of his Captaine or Governour. He is alſo called in the Germane tongue *Lieutenampt*, which is as much to ſay, as having *the charge, or office over men*: becauſe that in the abſence of his ſuperiour, or his captaine, his office, and quality importeth as much, as if the Governour, or captaine, were preſent himſelfe, and therefore *Lieutenant*, being a name rightly impoſed upon him, he is to take care, order, & governe the company, and ought to be honoured, obeyed, and reſpected, as if the captaine himſelfe were preſent. Hence it is alſo, that a King hath his *Viceroy*, a Prince his *Adminiſtratour*, a Potentate his *Marshall*, or *Chancellour*, a Lord his *ſteward*, and a Coronell, or Governour, his *Lieutenrnt Coronell*, or *Lieutenant Governour*.

A Lieutenant then muſt be an able, and a ſufficient man, capable of his charge, and experienced in the wars, underſtanding the duty of a Captaine, becauſe he is to execute it in his abſence, and to be an eaſe unto him.

He is to receive all orders, charges, and commiſſions from his captaine, aſſuming no authority to himſelfe, unleſſe in the abſence of his captaine: for it is certaine that every military charge, ought to go by order, and to be received from his ſuperiour commander.

When it is required, hee is to give his captaine wiſe counſell, and to adviſe, and conſult with him for the good of the company, eſpecially in the time of action, and in matters of importance.

He ought alſo by his command, to appeaſe quarrels, betweene ſouldier, and ſouldier, not to be partiall, or favour one man more then another: for it is a point of juſtice, to compoſe a quarrell, and to give ſatisfaction to the party intereſſed, in ſo doing, hee ſhall ſupport his command, and gaine himſefe reputation. But in a matter of importance, he ought to acquaint his captaine therewith, that he may punish the offender, by committing him either to priſon, or cauſing him to give ſatisfaction to the gentleman or ſouldier wronged, and that for the avoiding of blood-shed.

A Lieutenant alſo muſt know how farre his authority extends in the preſence of his captaine, and that his captaines honour, and reputation ought to be as tender, and deare unto him as his owne.

In his Captaines abſence, he is to governe the company well, to take care that it be duely exerciſed, to command the inferiour officers, as the Sarjants, and corporals to doe their duties, to make them teach the ſouldiers the perfect uſe of their armes, that when they ſhall come to be exerciſed by his captaine, or himſelfe, they may be in a readineſſe.

When his captaine exerciſeth his company himſelfe, his place is then in the Reere of the company, to ſee that the words of command which is given by his captaine in the Front, be duely performed, and executed by the ſouldiers in the reare: likewiſe in marching his captaine being preſent, he is to bring up the reere of the company, and in his abſence to lead it, in the Front to the *gards*, and *paradoe*, and to ſee that every ſouldier doe their duty

upon

upon their guards, and thus much briefly for a Lieutenant.

Of an Enſigne.

AN Enſigne ought to a generous, able, yong man, above all things to be carefull of his honour, and reputation, and not to meddle with the company, but only his Collours, which is recommended to his charge, neither to command any thing to the ſouldiers, unleſſe in the abſence of his Captaine, and Lieutenant, having then full power, & command over them and to lead in the head of the company, with a Corſlet and a Pike. He ought to be beloved of all the gentlemen, and ſouldiers of the company, and to be kinde, affable, and liberall unto them, and to do them all curteous offices to their Captaine, which will gaine their love, and affection towards him.

His place marching in a deviſion, or battaile (unleſſe it be a Generalls or a Coronells Enſigne) is to march betweene the third, and fourth ranke of the pikes, and when the Generall, or ſome Prince paſſeth by in marching, he is to vaile his collours, and if ſtanding, to ſtep up into the Front to do the like reverence, without moving of his hat, He ought to have a ſingular care, that his collours be garded, aſwell to his lodging, as in other places.

Alſo in the day of battaile, ſeeing he carries the honour, and Enſigne of his country, rather then to looſe them, hee ought to make them his winding sheet, and in the company, or in a body or deviſion, hee is to march with gravity, and modeſty, and thus much of an Enſigne.

Of a Sariant.

NExt unto the three chiefe officers of a company above mentioned, follow the Sarjants of a company, whereof there are two to a private company, and three to a Colonels or a double company. The word Sarjant is borrowed from the French, and ſignifieth *a charge-bearer*. A Sarjant then should be a man of experience, ſtirring, and vigilant, and to have theſe three qualities, a wiſe man, a man of ſpirit, and a man of courage, for a good Sarjant is a great help to his captaine, and other officers, in helping to execute their commands. He muſt be alſo able, and ſufficient to teach the ſouldiers the true and perfect uſe of their armes, his duty is to march upon the flanke of the company or deviſion, to ſee that the ſouldiers keepes their rankes and files, and in the field or in gariſon to lead the ſquadron to their guard, to carry to priſon with his halbert (the ſigne of his authority) ſuch offenders, as his captaine or ſuperiour officer ſhall commit to the Provoſt marſhall. In exerciſing of the company the Sariants places are upon the right and left flankes, to looke that the ſouldiers ſtand right in their files & rankes, and to ſee that they performe the termes of direction in every motion given by the captaine in the Front, to cauſe the muskettiers to make ready by ranks and to lead them up to the place where they are to give fire. Moreover his duty is to attend on the Sarj. majour of the regiment, when he is to give out orders, and from him to receive the word, and other orders, to give it to his Captaine, Lieutenant, Enſigne, and corporall, to fetch amunition, powder, and match, and other materialls for the company, alſo to ſet out *perdues*,

and ſee them duely relieved, and thus much for the dutie of a Sarjant.

Of a Corporall.

EVery Company is devided into three ſquadrons, aud every ſquadron hath his Corporall and Lanſpreſadō, he is the head of the ſquadron, and ought to be an honeſt & able man, and ſufficient to diſcharge his duty, ſober, modeſt, and peaceable. He is firſt to have a ſquadron roule of all the gentlemen, and centinels names of his ſquadron, and when any new ſouldiers are entertained, he is to inſtruct them in the uſe of their armes, aud muſt not ſuffer the old ſouldiers to mock, or geere the yonger, if they do not their poſtures as they ought: ſeing that every man in every ſcience, and profeſſion muſt have a time of learning, before he can be perfect: and if he doth not well, he muſt goe over and over againe with them patiently, untill ſuch time, as hee hath made him a good muskettier, or a pike, for which he shall get commendations of his captaine, and his other officers.

In marching either in his ſquadron, or company the eldeſt Corporall is to lead the right hand file of the muskettiers, the ſecond corporall the left hand file, and the third in the midſt of the deviſion.

Being with his ſquadron upon his guard, he is to provide them wood, coales, and candle light, to keepe a continuall fire day and night.

Having an outguard, he shall doe his beſt endeavour to ſtrengthen as much as in him lieth, his little *corps de guard*, and ſet out his centinels according to the *avenues*, or commings on of the enemy: for the cutting off of a centinell, and the ſurpriſing of a *corps of guard*, is of a great importance, and may endanger ſometimes the overthrow of an Army. And therefore it behoves a Corporall to be very carefull and vigilant, and to viſite his centinels often, to give them charge to looke well about them, to relieve them duely, and not to ſuffer them to ſtand too long, eſpecially in cold weather.

His duty alſo is not to forget the *word*, but to imprint it in his memory, when the Captaine of the watch goes the firſt round, he shall with his ſword drawne againſt his breſt give it him, and ſo receive ſuch orders from him, as he ſhall command him. And afterward when the rounde comes againe, he shall cauſe the rounder, or gentleman with his ſword drawne to give him the word, before he let him paſſe, and if upon his guard, himſelfe, or his centinells should heare, ſee, or diſcover any men, or light matches, to have his men in a readineſſe with bullets in their muskets, and their matches lighted, and to come in ſilently to give his ſuperiour officers inteligence thereof, that they be provided before the alarme be given, to reſiſt an enemy, and to defend the guard. To conclude, he is to diſtribute powder, bullets, & match out to his ſquadron, and to have a care, that they keep their armes neate and cleane, and not ſuffer the holy name of God to be prophaned, or taken in vaine upon his guard.

Of a Gentleman of the Armes.

THe next in degree is the Gentleman of the Armes, who ought to be the

the eldeſt gentleman of a company, whoſe charge is to looke diligently to the armes of the company, to marke and figure them, and to keepe a liſt what number, and figure every ſouldier hath upon his armes, to cauſe the ſouldiers to keepe their armes neate and cleane, and if any thing be amiſſe, or broken, to bring them to the Armorers to be repaired, and if any ſouldier have his paſport, be ſicke, dead, or run away, himſelfe, or the corporall is to bring up his armes to his lodging, leaſt they be loſt, and to keepe them cleane, till he delivereth them to ſome ſouldier newly entertained. Moreover, he is to viſite the gards, to ſee that their armes be in good trime, to keepe the powder, bullets, and match, and to deliver out it to the corporals and Lanſpreſadoes.

In divers companies, eſpecially in great garriſons, there is a corporall of the gentlemen, who is to acquaint them in the field, when they are to lye *perdues*, and in garriſon to call them out in the *round-houſe*, to goe the round according to their ſeniority.

Of the Drummes.

EVery company alſo ought to have two good Drummes, that knoweth how to beate a call, a ſlow, or a ſwift march well, a charge, a retreate, and a *Reveille*: He should alſo be a linguiſt, becauſe oftentimes he may be ſent unto the enemy, for the ranſoming of priſoners, his duty is comming to the campe or garriſon of an enemy, having his Generalls paſſe in his hat, to beate a call, till he is fetcht in, and becauſe he shall not diſcover the weakeneſſe of guards, workes or trenches, he is led blindfold, and ſo carried to the Commander, and place where his priſoners are, with whom after he hath ranſommed them, he is to returne to the camp or his garriſon.

Of a Drumme Majour.

EVery Regiment ought to have a *Drumme-majour*, to whom when it is watch time, the other Drummes are to repaire, there to beate a call, and to march with his company that is appointed for the guard. A Drum-majour ought to be a grave man, able to inſtruct the other Drummes to beate a true march, and other points of warre, to ſee the Drummes that beate upon a march to be duely relieved, and alſo to ſpeake divers tongues, and to be wiſe, and cautelous what he shall ſpeake to an enemy.

Of the Clarke of a Company.

THe Clarke of a company ought to be an honeſt, and a ſufficient man, whom his Captaine may entruſt for the fetching of his months pay, & the due and ſeaſonable payment of the company: his duty is to keepe the muſter-roule, to have it upon all occaſions in a readineſſe, to enter his men,

both into his muſter-roule, and pay bill, to receive the ſervice mony of the Company, to ſee the ſouldiers duely paid it, and to deliver up every pay-day a true pay bill unto his Captaine, or chiefe officer.

Of a Barber Chirurgian.

LAſt of all there ought to be in a company, a good *Barber Chirurgian*, both to trime the ſouldiers, and to have skill in *Chirurgerie*, that when the company watches in approaches, and guards, where there is danger, he may be at hand (in the abſence of the *Chirurgian* of the Regiment) to bind up and dreſſe hurt, and wounded men, in doing thereof, he is to be free from all other duties, belonging to the company, ſeing he is an officer, allowed in the States liſt.

Of a Gentleman, and of a private ſouldier.

IN a company of foot, there are both Gentlemen, centinels, and private ſouldiers: but in a Generalls, or Coronels company, there ought to be good ſtore of brave gentlemen of quality, valliant, & capable of preferment, when the Generall, or coronell ſhall finde them worthy, and deſerving.

The firſt duty then required in a gentleman, or private ſouldier is obedience, as appeared by the *Centurion*, in his anſwere to our Saviour in the holy Goſpell which teacheth us obedience ſaying, *I am a man under authority having ſouldiers under me, and I ſay to this man goe, & he goeth, & to another come, and he commeth & to my ſervant do this, and he doth it.* Math. 8. 9. For without this a whole army is worth nothing, and to this vertue alſo he muſt joyne love, & reſpect to his Captaine, and ſuperiour commandour.

A Gentlemans duty at his firſt entrance into the profeſſion of a ſouldier, following a Generals, or coronels company, is to ſtand centinell for a moneth, to learne the firſt degree of a ſouldier, that he may be the better able to command others when he is advanced. In places of danger, either in the field, or approaches he is to lye *perdu*, with his piſtoll and ſword, and not to budge from his place, till he be relieved: not to retreate for one man, but in caſe of more, then to fall back to the ſecond, & diſcovering an enemy comming off betimes, and ſilently, hee muſt give the *alarme*; that the *Corps de gard*, or company may be provided to defend themſelves.

A Gentleman alſo is to goe the Round with the captaine of the watch, or his fellow-gentlemen, either in field or in garriſon, to give the corporall of the guard *the word*, and to charge the centinells to looke well about them.

A centinell alſo ought to underſtand well his duty, to come to his ſquadron, or company at ſeaſonable times, at the drummes beating, or otherwiſe, or when they are to draw in armes, and to ſet the *paradoe*. To be very

vigilant

vigilant and carefull upon his centinell-ship, and to have as many eyes about him as *Argus* had, ſuffring no man in the night to paſſe without crying *Qui va lá*, and calling his *Corporall* to take the word, unleſſe he be commanded to come in ſilently. He muſt alſo take delight in the handling, and uſe of his armes, and ſee that he keepes them fixe, neate, and cleane, and goe handſomely in his cloathes. He muſt play the good husband, and menage well that little meanes he hath.

In marching or ſtanding, he muſt have a ſingular care to keepe his ranke and file, and not to ſtirre out of it (without command) yea if he were ſure to kill an enemy: hee ought alſo in fight, and in the day of battell, to hearken well to his officers command, that when his officer may fall, or cannot be heard in a charge: he may be acquainted with the ſound of the drumme, when it beates a march, a charge, or a retreate. He muſt not be given to sharking, and oppreſſion, but as *Saint Iohn Baptiſt* teacheth us in the Goſpell, Luk. 3. 14. *to do violence to no man, neither accuſe any falſly, & be content with his wages*, he muſt be no drunkard, horemaſter, or a theefe, knowing how honourable his profeſſion is, & how deare his reputation should be unto him: but ought rather to arme himſelf with theſe chriſtian vertues, the feare of God, praying morning and evening, and with *Moſes to number his daies that he may apply his heart to wiſedome*, hee should of all men be prepared to welcome death, ſeeing that a bullet in a moment, may ſend him from earth to heaven. Moreover, he muſt be diligent, active, ſober, patient, couragious, diſcreete, and curteous. Carefulneſſe and labour will exerciſe him, and fortitude, with valour wil teach him to execute, & ſuffer patiently all fategations of the war.

To conclude I would have a gentleman, and a ſouldier ambitious of his preferment, and advancement: knowing how many brave Generalls and commanders, even from private ſouldiers (paſſing through all the degrees, and offices of a ſouldier) have raiſed their advancement, thinking that he may alſo come to the like height of honour, withal remembring how many worthies, Emperours, Kings, Princes, Dukes, Earles, Nobles, & gentlemen have been of this honourable profeſſion, & what *Heroick*, and brave actions they have done & performed, how many brave battells they have fought & what victories they have gained, leaving in hiſtory *Trophes of* their memorable actions, to eternize their everliving memory to poſterity. And thus I have runne through all the offices of a foot company.

Of the Armes appertaining to a Company.

THe Armes which wee use in these our moderne warres, are a Pike, Corslet, a Gorget, a Head-peece, and Taces, A Musket, Banedliers, and a rest, a Cutlace, a basket hilt sword, and a Rapier. And for a Captaine marching, a light Armour pistoll proofe, but upon service, an Armour and a Head-peece of high proofe, falling on with his Pike.

A Lieutenant an Armour, and a Partizan, and an Ensigne (besides his Collours) an armour, & a Pike, a Sarjant a Halbart, having two or three good Drummes, all which belongs to a Company, the figure, proportion, length, and bore, according to the States order, you shall see hereafter.

NEXT FOLLOVVES THE POSTVRES OF THE PIKE, AND MVSKET,

represented by figure, having the word of command under every of them, with briefe observations on the first page, answering to the number of every figure.

THe postures of the Pike may be done either standing, or marching. In marching (as well as in standing) a pike-man may advance, shoulder, or charge his Pike, either to the Front, to the Reere, to the right, or left flanke, according to the terme of direction given him by his officer.

The postures likewise of a mukettier are also done, either marching or standing, by himselfe, or in his squadron, company or devision.

A good muskettier that is ready, and well made by his officer will fall naturally, and gracefully to the doing of his postures, and will take delight in handling of his musket, avoyding antique, and dancing postures, which heretofore have beene taught by some officers, but now is growne rediculous, not beseeming and becomming the grave comportment, and carriage of a souldier.

A Captaine then, having a commission given him to raise a compaxy, ought to make choise of the taller, and abler men for his pikes, and of the shorter, stronger, and well set, with good legges for his muskettiers, yea, such as may be able to endure both hardship, and labour. And thus much as a short preamble by the way, before we come to shew the figures of the postures themselves.

The principles of the Art military,

Briefe obſervations upon the poſtures of the pike, anſwering to the number of every figure following.

1 SEt the butt end of your Pike neere your right foot, on the outſide, holding it right up in your right hand, about the height of your eye, and your arme a little bending, and your right foot forward.

2 With the right hand alone bring your Pike juſt before your body, bearing it directly right up, raiſing the but end from the ground, then take the Pike with your left hand about the height of your girdle.

3 Forſake the Pike with your right hand, and with the left hand alone raiſe up the Pike, that the But end be about the height of your thigh, then take the But end in your right hand, without ſtooping to it.

4 Forſake the Pike with the left hand, and with your right hand alone carry the Pike right up, locking the Pike betweene your ſhoulder and arme, your right hand holding the but end of the Pike, about the height of your hip.

---

5 Sinke your right hand a little, and with your left hand take the Pike, as high as well you can reach, and bring the Pike juſt before your body.

6 Forſake the Pike with your right hand, and bring downe the pike in your left hand, that the but end be neere unto the ground, then with your right hand take the pike about the height of your head.

7 Forſake the Pike with your left hand, and with the right hand onely ſet the but end on the ground, on the outſide of your right foot, as in the third poſture.

8 Bring the Pike juſt before your body, and raiſe the but end from the ground, bearing it forward, then take it with your left hand a little beneath your right.

---

9 Bring forward the Pike with your left hand, and take it in your right, reaching backeward as farre as well you may.

10 Forſake your Pike with your left hand, and with the right onely lay it upon your right ſhoulder, bearing the but end about a foot from the ground, holding your thumb under the Pike, the better to governe it, carrying the pike forward.

11 Beare your right hand with the pike backward, as farre as well you can, with your left hand take the pike forward, and with the right hand beare the pike upward.

12 Forſaking the Pike with the right hand, caſt the point forward that the but end may conveniently be taken in the right hand.

---

13 Take the But end of the Pike in your right hand, holding it about your hip, and raiſing the pike with your left hand about the hight of your breaſt, carry the Pike directly before you, your left foot forward.

14 Raiſe the right hand and ſtretch it backward, your left hand being at your breaſt, your left elbow againſt your hip.

15 Beare downe the but end of the Pike with your right hand, and raiſe the pike with the left, and ſo advance, as in the ſixt figure.

16 Sinke your right hand, and with your left take the Pike as high as well you can reach, bringing the pike juſt before your body.

practiſed

1

Order yor Pike.

2

Aduance yor Pike in three motions. The first Motion.

3

the ſeacond Motion

4

the thied Motion being Aduanced

5

Order yor Pike in 3 motions. the first Motion

6

the 2^d Motion

7

The 3^d motion being ordered

8

Shoulder yor Pike in 3 motions The first Motion

9

The ſeacond Motion.

10

The 3^d motion being Sholdred

11

Port yor Pike in 3 motions. the first Motion.

12

The 2^d Motion.

13

The 3^d motion being Ported.

14

Charge yor Pike

15

Advance yor Pike.

A

16

Sholder yor Pike in 3 motions. The first Motion.

The principles of the Art military.

Briefe obſervations upon the poſtures of the pike, anſwering to the number of every figure following.

17 Forſake the but end with your right hand, bearing forward your Pike in the left hand, and take the pike backward in the right hand, as farre as well you may reach.

18 Forſake the Pike with your left hand, and with your right onely lay it upon your ſhoulder, or as in the twelfth figure.

19 Beare the pike with your right hand backward, take it forward in your left hand as you may conveniently reach, bearing the pike with your right hand upward.

20 Forſaking the Pike with your right hand, beare it over your head, and at the ſame inſtant turne your body to the left hand, that you may conveniently take the but end of the Pike in your right hand.

---

21 Having the but end of your Pike in your right hand, ſtretch your right arme backeward, and ſet your left hand at your breſt, &c. as in the ſixteenth figure.

22 Slip your left hand forward as farre as well you may, and lift the Pike upwards to your head, and with the right hand beare the but end ſomewhat downeward.

23 Forſaking the but end of the Pike with your right hand, beare up the Pike over your head with your left hand onely, at that inſtant turne your face to the right hand, and be ready with your right hand to take the Pike more backeward.

24 Having the Pike in the right hand, forſake it with your left, and with the right hand onely lay it upon your ſhoulder, as in the 12 and 20 figure.

---

25 This is to be done in three motions, as the contrary is showne in the ninth, tenth, eleventh figures. Beare the Pike with the right hand backward, with your left take it forward, bearing the but end downeward, then ſlip downe your right hand a little above your left, and ſet the but end on the ground, as in the ninth figure.

26 This is to be done by ſeverall palming poſtures, with the right hand beare the but end of the Pike backward, as farre as you can, and continew palming till you come to the head of your Pike.

27 VVith your left hand hold the pike a little below the head, your right hand more backward, as farre as the cheekes or arming reach, ſet your right hand upon your hip, your elbow ſtretcht forth and your left hand more forward before your breaſt,

28 Remove your right hand to your left, and in your right hand onely carry your pike, your hand being upon your hip.

---

29 This to be done by ſeverall palming poſtures backeward, bringing forward your right hand as farre as well you can, and with the left hand gripe the pike backward as farre as you can.

30 Forſake the Pike with your right hand, bring forward the Pike with the left, and take it backward with the right, and ſo continue palming untill you have the but end of the pike in your right hand.

31 Stretch your right arme backward with the but end of the pike in your hand, your left hand at your breaſt, and your elbow upon your hip, as in the ſixteenth figure.

32 This is to be done in three motions, firſt bearing the pike right up before the body, and ſo forward as from the advance in 6, 7, and 8 figures, onely you muſt obſerve to ſet the but end of the Pike at the inſide of the right foot, which is your cloſſe order.

33 The but end of the Pike reſting againſt your right foot, take it in your left hand, about the height of your girdle, and ſtep forward with your left foot, the knee bent lay your left arme upon your knee couching downe low, and draw your ſword over your left arme.

34 Raiſe your body right up, ſet your Pike againſt your right ſhoulder with the left hand, the but end being ſtill upon the ground, then put up your ſword.

practiſed

17

The 2d motion.

18

The 3d motion being Sholdred

19

Charge to yr Reare in 3 motions the first motion.

20

The 2d motion.

21

The 3d motion being Charged

22

Recouer yo Pike and Sholder in 3 motions The first motion.

23

The seacond motion.

24

The 3 motion being Sholdred.

25

Order yo Pike.

26

Cheeke yo Pike the first motion.

27

The 2d motion being Cheeked.

28

Trayle yo Pike.

29

Charge yo Pike and Charge first Palmeing motion.

30

The 2d Palming motion.

31

Charge yo. Pike.

32

Order at close Order.

Charge for horſe and draw yo sword

33

Put up your ſword & order yo Pike

Briefe obſervations upon the marching poſtures of the muſket, anſwering to the number of every figure following.

1 THis figure sheweth a muskettier marching with his musket on his left shoulder a ſlope, holding the but end of it with his left hand, and his match betweene the two leſſer fingers, with his reſt in his right hand, and his right leg before.

2 How he carrieth his musket shouldred, with the reſt croſſe, cloſſe to the inſide of his musket, his match betweene his two fingers, holding his thumbe upward to the forke of the reſt, and his right legge before.

3 Draw the right legge to your left, and withall ſinke your musket, and ſlip your reſt, griping it with your right hand betweene the brich, and the thumb hole, as this figure shewes.

4 Hold the musket upright in your right hand, and on your right ſide, raiſe your left hand to the forke of your musket, and ſet your thumbe againſt the Forke, as in this figure.

---

5 Sinke your right hand, and gripe the musket faſt in your left hand, with your reſt on the outſide, holding your thumbe hard againſt the eare of your Forke, to locke the reſt faſt to your musket in your left hand, that you may have the uſe of your right hand, to doe the poſtures following.

6 Take your match from betweene your little finger, with your thumbe, and the ſecond finger of your right hand, being turned with the palme from you.

7 Bring the right hand with the match backward, and your left hand with the musket, and reſt forward, turning your face a little backward, and blow off your match with a good blaſt.

8 Holding your match betweene your thumbe, and ſecond finger, bring it to the cocke and preſſe it into the cocke with your thumbe.

---

9 Your thumbe and finger being upon the cock, and your ſecond and third finger under the cock, pull the cock downe to the pan, and with your thumbe, and middle finger, either raiſe or ſinke it, that it may fall right into the pan.

10 Lay the two fore-fingers of your right hand upon your pan, the thumbe behind the ſchutchin of the pan, the eaſier to lift up the musket, and ſo bringing up the musket with both hands toward your mouth not ſtooping, blow againe your coale.

11 Open your pan with your two fingers, and withall bring backe your right hand to the thumbe-hole of your musket, your ſecond finger to the tricker, and with your left hand fix the forke of the reſt to your musket, your thumbe againſt the forke, and the pike end of the reſt upon the ground.

12 Lye on, and lift up your right elbow, bringing the but end of your musket within your shoulder, neere your breaſt, winding your shoulder to it, holding it faſt from recoiling, preſenting a faire body, the ſmall end appearing a little above your shoulder, having the left legge before, bending a little with the knee, and reſting ſtiffe upon your right legge, take your marke breaſt high.

---

13 Firſt, ſinke the but end of your musket, and with the reſt bring it to your right ſide: then ſteppe forward with your right legge, and carrying your musket in your left hand, fall away.

14 Take the match out of the cocke with the thumbe, and ſecond finger of your right hand, holding the musket, and reſt in the left hand onely.

15 Returne the match betweene the two leſſer fingers of your left hand, from whence you had it.

16 Bring up the musket with the left hand onely towards your mouth, and withall blow your pan ſtiffely, not ſtooping with your head, in the meane time take your touch boxe in your right hand, as this figure sheweth.

practiſed

March with your rest in yowr hand.

March and with your Musket carrie yor rest.

Vnshoulder your Musket.

Poize your Musket.

Joyne your rest to yor Musket

Take forth your Match

Blow off your Coale.

Cock your Match.

Try your Match.

Guard, blowe and open your pann.

present.

Giue fire.

Dismount your musket.

Vncocke your Match.

Returne your match.

Cleare your pann.

Briefe obſervations upon the marching poſtures of the musket, anſwering to the number of every figure following.

17 Hold your touch-boxe betweene the thumbe, and fore-finger of the right hand onely, and ſo prime, as in the figure

18 Lay the right thumbe over the barrell neere the pan, and with your two foremoſt fingers shut the pan.

19 Hold your musket faſt with the right hand at the breech, the left as before, turning the pan downewards, that the looſe powder may fall off.

20 Hold your musket in both hands as before, heave it up towards your mouth, not ſtooping blow off the looſe duſt, or cornes.

---

21 Hold your musket in both hands as before, beare it upright towards your left ſide, and withall ſtep forward with your left legge, then holding the musket onely in the right hand at the breech, forſake your reſt.

22 Having forſaken your reſt, take the musket into your left hand, about the middle of the barrell: ſo as the but end touch not the ground, trailing your reſt betweene your musket, and your body.

23 Take your charge in your right hand, with the thumbe and fore-finger thereof, thruſt off the cover.

24 Draw backe your left hand with the musket, as farre as conveniently you can, and with you right hand put powder into the bore of the barrell, holding the charge betweene your thumbe and fore-finger onely, as this figure sheweth.

---

25 Take your bullet forth of your bag, or out of your mouth, and put it into the muzzell of your musket.

26 With your right hand turning the palme from you, draw forth your ſcouring-ſtick, bearing your body, and your left hand with your musket, ſo farre backe as you can.

27 Having drawne forth your ſcouring-ſticke, ſet the rammer head againſt your breaſt, and ſlip your hand looſe to your rammer, that you may the eaſier put it into the muzzel of your musket.

28 After your bullet, (leaſt it should fall out againe, either in skirmishing, or upon a ſlooping trench) put in ſome Harts haire, or ſome other ſtopping, and then with your ſcouring-ſtick, ramme home your powder, bullet, and ſtopping, twice or thrice.

---

29 With your right hand turned, draw your ſcouring-ſticke out of your musket, as before.

30 Your ſcouring-ſticke being drawne forth of your barrell, turne it, and bring the ſcouring-ſticke end to your breaſt, and ſo ſlip your hand, within a handfull of the end.

31 Returne the ſcouring-ſticke into its ſocket, from whence you had it.

32 Bring forward your musket with your left hand, and beare it right up, take it into the right hand at the breech; and ſo hold it in your right hand onely.

practiſed

Prime your panne

Shut your panne.

Cast of your Looſe pouder

Blowe of your Looſe pouder

Cast about your muſket.

Traile your reſt.

Open your charge

Charge your muſket

raw forth yo.r ſcouring ſtick

Shorten your ſcouring ſtick

Put in your bullet & Ramme home.

Withdrawe yo.r ſcouring ſtick

horten yo.r ſcouring ſtick

Returne your Scouring Stick

Recouuer your muſket

Poize your muſket & recouuer your reſt

The ſtanding poſtures of the muſket, and how to make ready upon the reſt, in a ſquadron, company, or diviſion.

1 BRing up your left hand, with the forke of the reſt to the muſket, and pick your reſt upon the ground, your left leg, ſomewhat bending, as in this figure.

2 Take the match betweene the thumbe, and ſecond finger, as in the 16 figure marching.

3 Turne a little with your head behind your pan, and blow your match with a good blaſt.

4 Holding your match betweene your thumbe, and ſecond finger, cock it, as in the eight figure marching.

---

5 Your thumbe and fore finger being upon the cock, and your ſecond, and third finger under the cock, pull your cock to your pan, and raiſing, or depreſſing it, looke that it fals right into the pan.

6 Hold the two fingers of your right hand upon your pan, and the thumbe behind the ſcutchian.

7 In preſenting draw backe firſt your left leg to your right, and withall ſtooping a little with your head to your pan, being guarded, blow off your coale.

8 Lying on (as in the 12 poſture marching) in opening your pan, fall backe with your right leg, bring your right hand to the thumbe-hole of your muſket, preſenting a faire body, hold your muſket hard, and cloſſe betweene your breſt and your ſhoulder blade, and pull ing your tricker with your fore finger give fire.

---

9 Having given fire, bring up your right leg againe to your left, as in the 7 figure, and withall uncock your match.

10 Set forward your left leg againe to your firſt ſtand, and returne your match betweene the two leſſer fingers of your left hand, and after that doe theſe poſtures following, as in the figures marching, *viz. Cleare your pan, prime your pan,* and *ſhut your pan,* as in the 17, 18, and 19 poſtures marching.

11 In taking up the reſt hold your muſket right up, caſt off your looſe cornes, and falling backe with your left leg ſomewhat ſtradling, bring up the pan even againſt your mouth.

12 Firſt blow off your looſe duſt, or cornes with a ſtiffe blaſt, and then caſt about your muſket to your left ſide, falling a little backe with your left leg.

---

13 Having forſaken your reſt, hold the muſket faſt in your left hand, about the middle of the barrell, ſo as the but end touch not the ground, and bringing forward the muzzell of your muſket to charge, your right hand being at liberty, do theſe poſtures following, namely, *Open your charge, Charge with powder, draw forth your ſcouring ſticke, ſhorten, charge with bullet, put in ſtopping, ramme home, withdraw your ſcouring ſticke, ſhorten,* and returne, as in the 23, 24, 25, 26, 27, 28, 29, and 30 figures marching.

14 Bring forward your muſket with your left hand, bearing it upright, taking it into your right hand at the brich, withall bring forward your left legge even with your right, as in the eleventh figure.

15 Hold the muſket bolt upright in your right hand, and having the reſt in your left hand, ſlip your hand, and your thumbe upward to the forke, as in the marching poſture number 4.

Note by the way, that from this poizing poſture, you may either *joyne your reſt to your muſket,* as in the fifth poſture marching, or *reſt your muſket,* as in the firſt figure ſtanding, or elſe *ſhoulder your muſket,* as in the next figure following.

16 Having your muſket poized, hold the reſt a handfull under the forke, then bring the muſket before your body, and your reſt croſſe over it behind your thumbe hole, and ſo with both hands lay it gently on your ſhoulder, having the reſt a croſſe your body, drawing in your right legge to your left, and then falling back againe with your right leg to your ſtand, either ſtand or march away. And thus much for the ſtanding poſtures of the muſket.

practiſed

1

Rest your Muſket.

2

Drawe out your match

3

Blowe your match.

4

Cock your match.

5

Try your match.

6

Gard your panne.

7

Preſent

8

Giue fire.

9

Come vp to yor muſket.

10

Returne your match.

11

Take vp your rest.

12

Blowe of your looſe powder. & Caſt about your muſket.

13

Traile your rest & open your charge &c.

14

Bringe vp your muſket

15

Poize yor muſket and recouer your rest.

16

Shoulder your muſket.

E

Briefe obſervations for a Muſkettier.

When a Muſkettier is to be exerciſed in his ſquadron, Companie, or deviſion; all poſtures both marching, and ſtanding are readily done, and reduced to theſe three wordes of command, to wit,

Make ready.

Preſent.

Give Fire.

For, firſt a good Muskettier, which hath all his poſtures perfectly, heareing his officer give the firſt terme of direction make ready, will quickly runne them over, euen from vnshouldering of his musket, to the guarding of his panne, which is the ſixth poſture ſtanding, and the eleventh marching before he comes to preſent.

Secondly, in preſenting he wilbe ſure to blowe his match well, open his panne, fall back with his right hand to the thumbe-hole of his musket, and having his fore-finger upon the tricker, ſetting forward his left legge, will attend the next word of direction.

Thirdly, lying on before he comes to give fire, bending his left knee, will fall back with his right legge, bringing the butt end of his musket, cloſe betweene his breſt and shoulder, raiſing his elbow, holding his musket faſt, and hard to his shoulder (which will keepe it from recoyling) reſting firme upon his right legge will give fire.

Having given fire, he taketh vp his musket, and reſt gracefully, and bringing vp his right legge againe fals away in his ranke, returnes his match, cleares his panne, primes his panne, & doth quickly all his poſtures ſtanding, or marching, as hath bene taught, and which shalbe showne more at large by figure, when wee come to the exerciſing of Muskttiers in groſſe.

Nowe

NOwe followes the true forme of exerciſing of a Foote Companie of 40 pikes, and 40 muſkettiers beſides officers, repreſented by figure, the wordes of Commaund, & demonſtration: but before we come to the particular motions, it is neceſſarie for a yonge ſouldier a knowe.

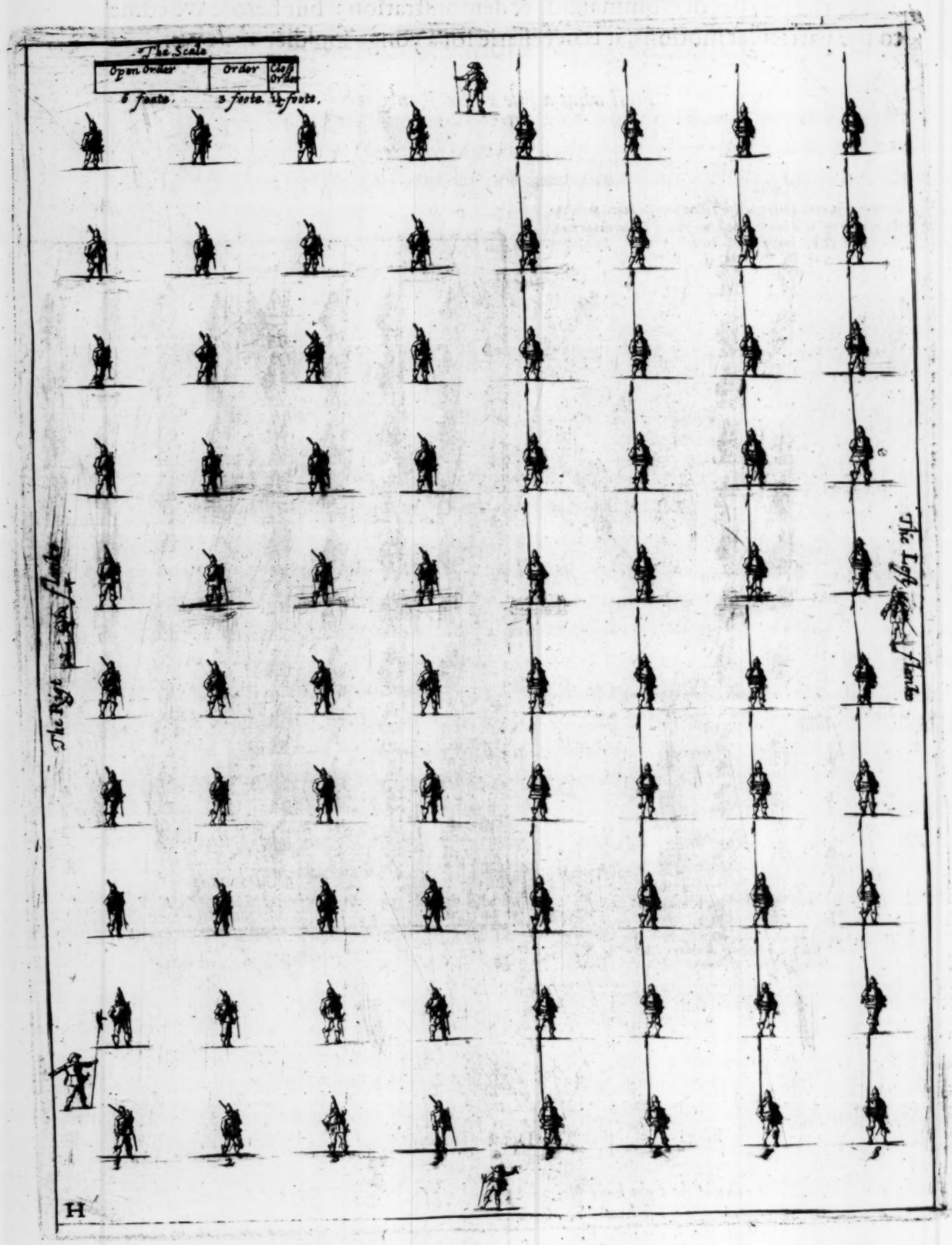
Firſt what a File and a Ranke is?

Files.	The Demonſtration.	Rankes.
Number: 1. The Leader of the right hand file.		Letter: a. The firſt Ranck of Leaders.
2. The Leader of the left hand file.		b. The laſt Ranke of Bringers vp. (front.
3. The middle file on the right hand.		c. The Rankeiof the Leaders of halfe files to the
4. The middle file on the left hand.		d. The Ranke of the Leaders of halfe files to
5. The ſecond file next the right hand.		e. The ſecond Ranke next the front. (the Reere
6. The ſecond file next the left hand.		f. The ſecond Ranke next the Reere.
7. The third file from the right hand.		g. The fourth Ranke from the front.
8. The thrid file from the left hand.		h. The fourth Ranke from the Reere.
		i. The third Ranke from the front.
		k. The third Ranke from the Reere.

THirdly, to vnderſtand well the three diſtances, namely, *Open order*, *order* & *cloſe order*.

The Definition.

Open order then, or the firſt diſtance is, when the ſouldiers both in *Ranke* and *File* ſtand ſixe foot remoued one from an other, as the *ſcale*, and this figure following shewe.

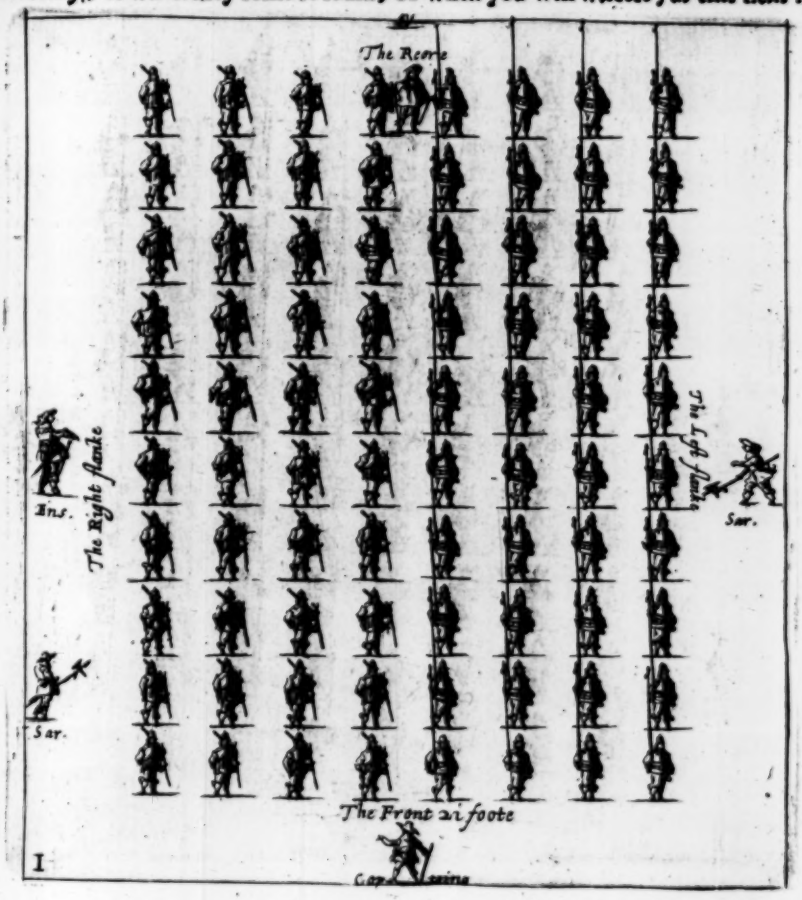


Obſervations.

BEcauſe the meaſure of theſe diſtances cannot be taken ſo exactly by the eye, we take the diſtance of ſixe foote between *File* and *File*, by commanding the ſouldiers, as they ſtand, to ſtretch foorth their armes, and ſtand ſo remoued one from an other that their hands may meete.

And for the *Rankes*, we make account we take the ſame diſtance of ſixe foot, when the butt end of the pikes doe almoſt reach their heeles, that march before them.

The ſecond diſtance, or your *Order* is, when your men ſtand three foot remoued one from an other both in *Ranke* and *File*, and this *order* is to be vſed when they are embattailed, or march in the face of an Ennemy, or when they come to ſtand, or when you will wheele, as this next figure repreſents.

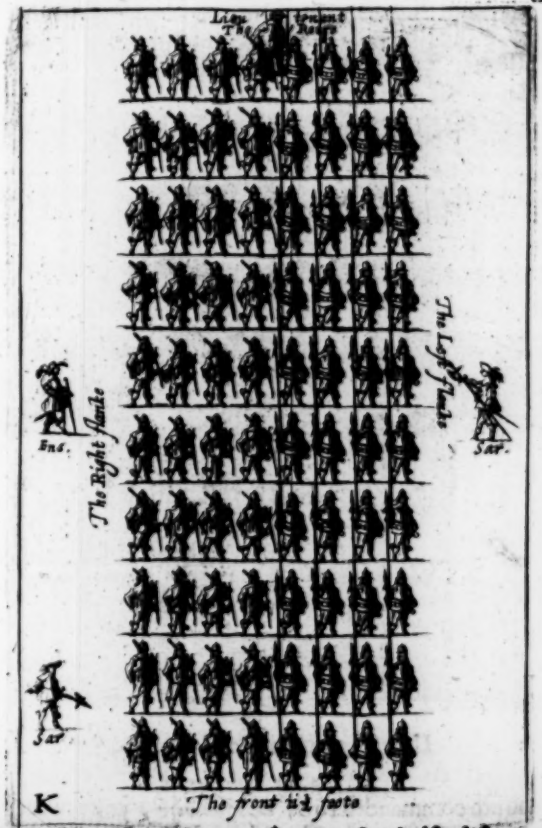


Obſervations.

WEe take the ſecond *order*, or diſtance betweene *File* and *File*, by bidding the ſouldiers ſett their armes a *Kenbowe*, and put themſelues ſo cloſſe, that their elbowes maye meete. And wee reckon wee take the ſame diſtance betweene the *Rankes*, when they come vp almoſt to the ſwords point.

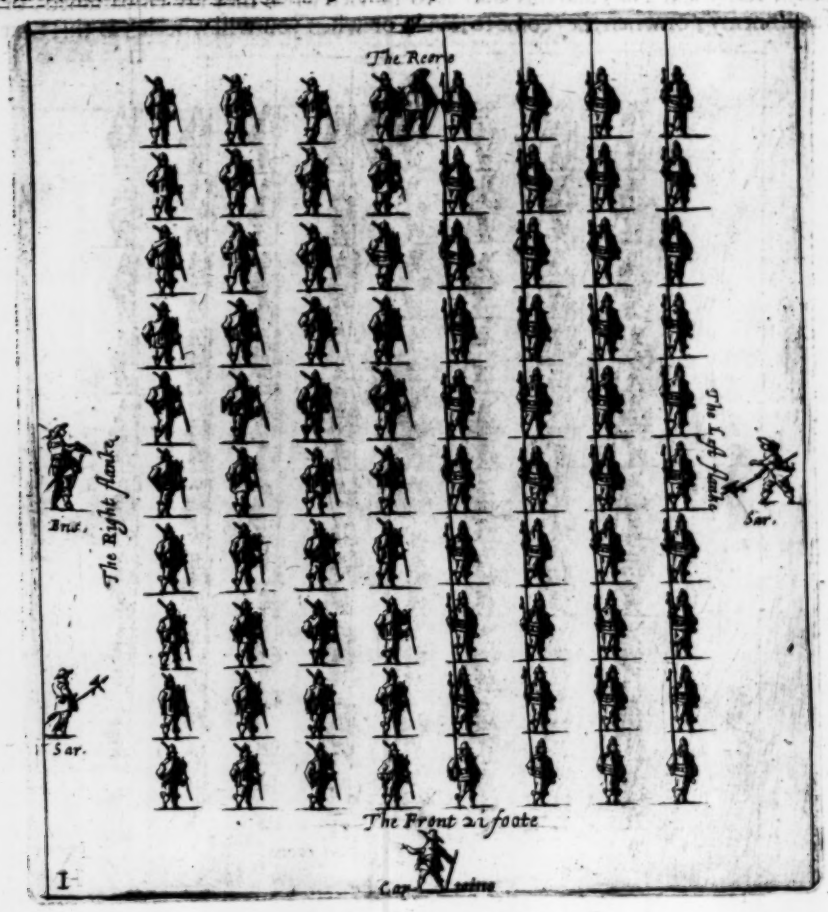
Note, that when you march throw any countrie, you moſt obſerve three foote onely from *File* to *File*, and ſixe from *Ranke* to *Ranke*.

The thrid diſtance, or your *cloſe order* is commanded by this word *Cloſe* which is, when there is one foote and a halfe from *File* to *File*, and three from *Ranke* to *Ranke* as this Figure demonſtrates.



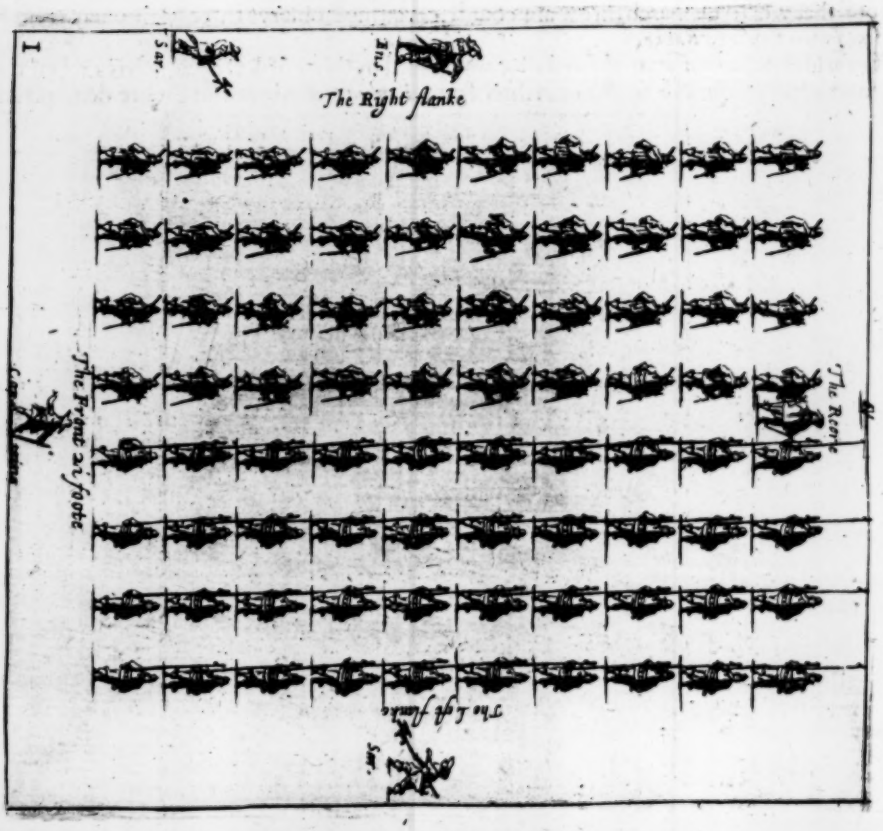
OBſerve that though this figure ſtands but at a foote and a halfe diſtance: yet this is for the pikes onely, and muſt neuer be vſed, but when you will ſtand firme to receiue the charge of an Ennemy. The muskettiers muſt neuer be cloſer, then the ſecond diſtance of three foote in ſqnare, becauſe they are

THis figure represents the 40 Pikes, and 40 Musketiers standing in their order, because the page will not beare the first foure motions in their open order.



Heere beginnes the words of Commaund.

1. *Stand right in your Files.*
2. *Stand right in your Rankes.*
3. *Silence.*



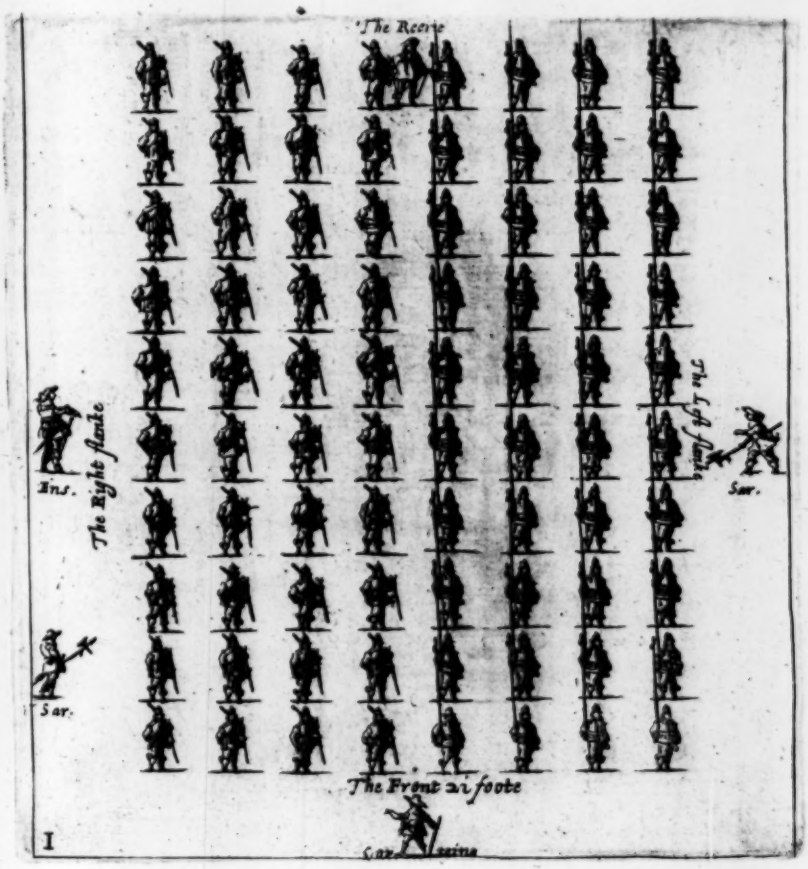
Heere beginnes the first motion.

5. *To the right hand.*

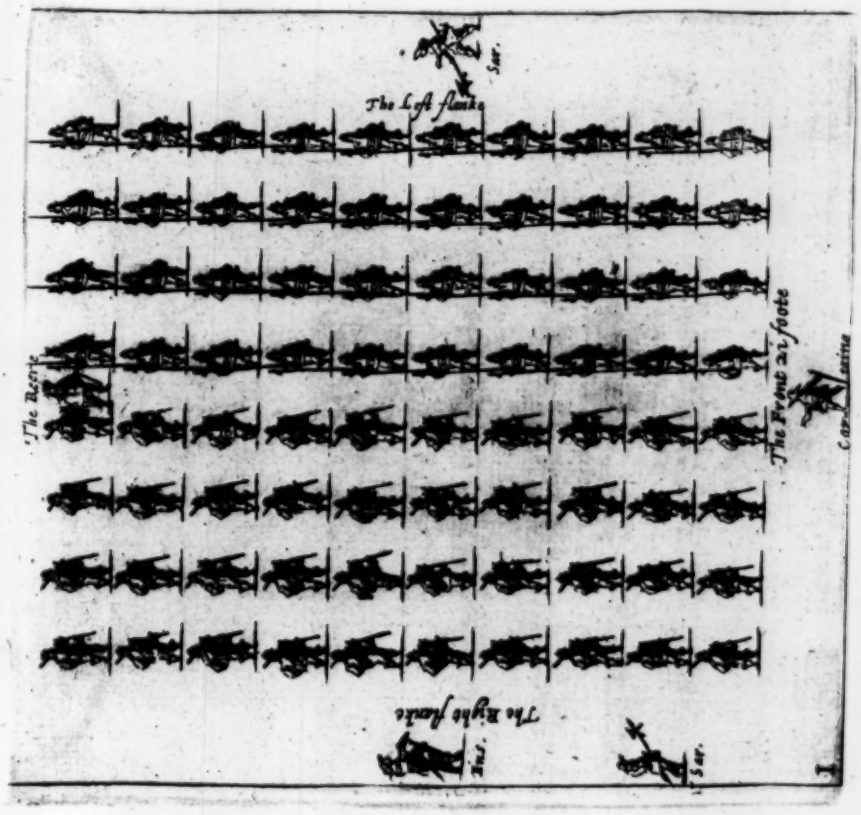
IT is be noted, when you are commanded to be *As you were*, you are euer to turne to the contrarie hand from whence you came. As for example, if you did turne to the right hand, you are to returne to the left hand, and so in the rest.

5. *As you were*, that is, as you stand in your order in the figure aboue marked with the letter I.

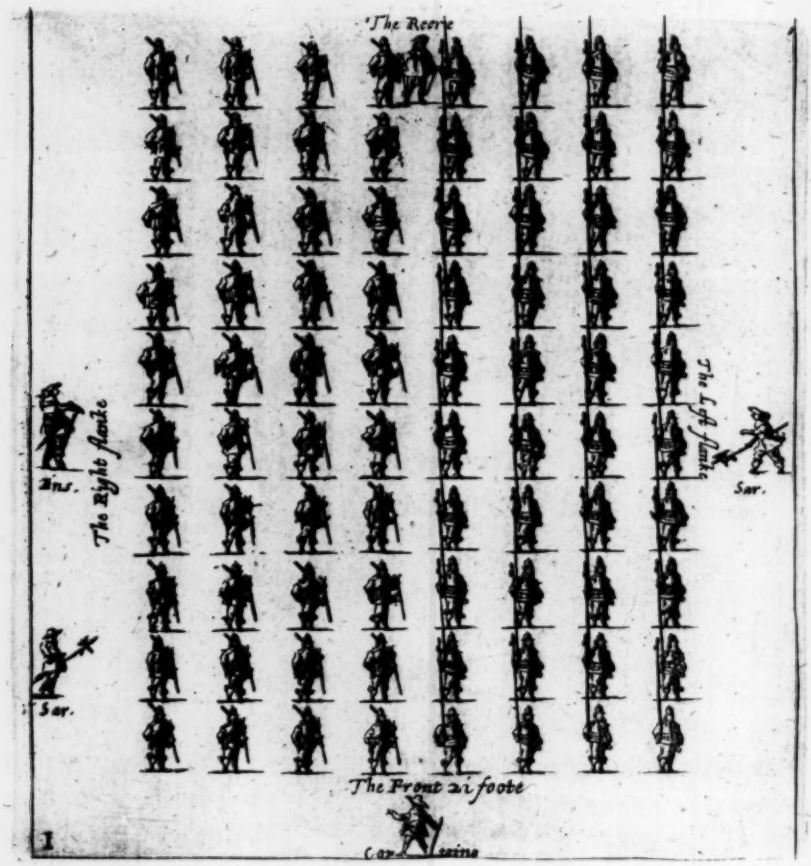
THe Reader may be pleased in these motions to turne the booke to the front.



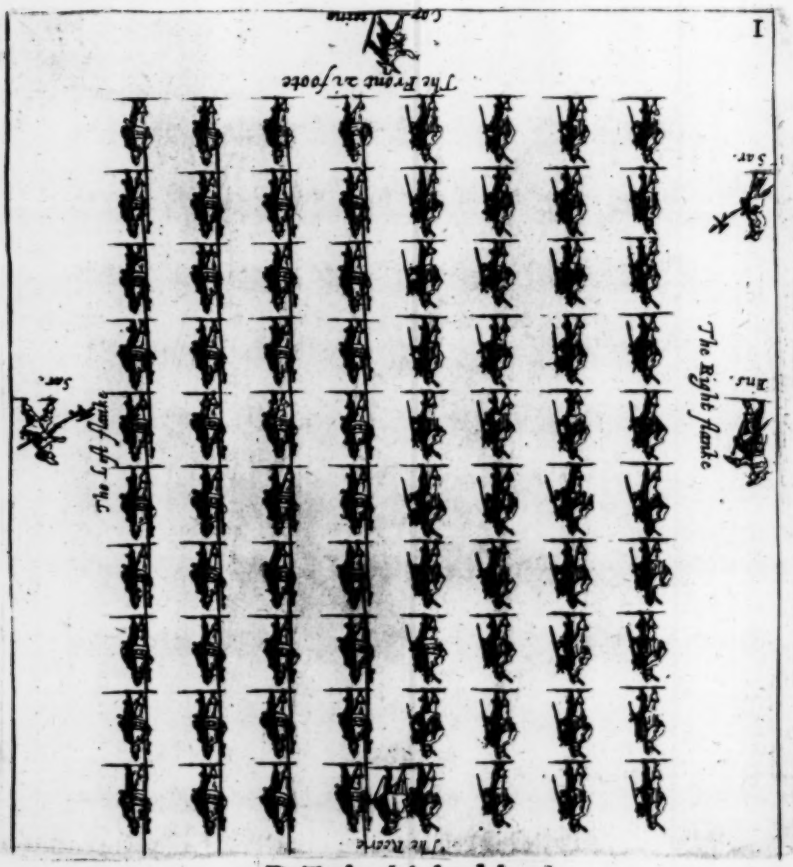
6. As you were.



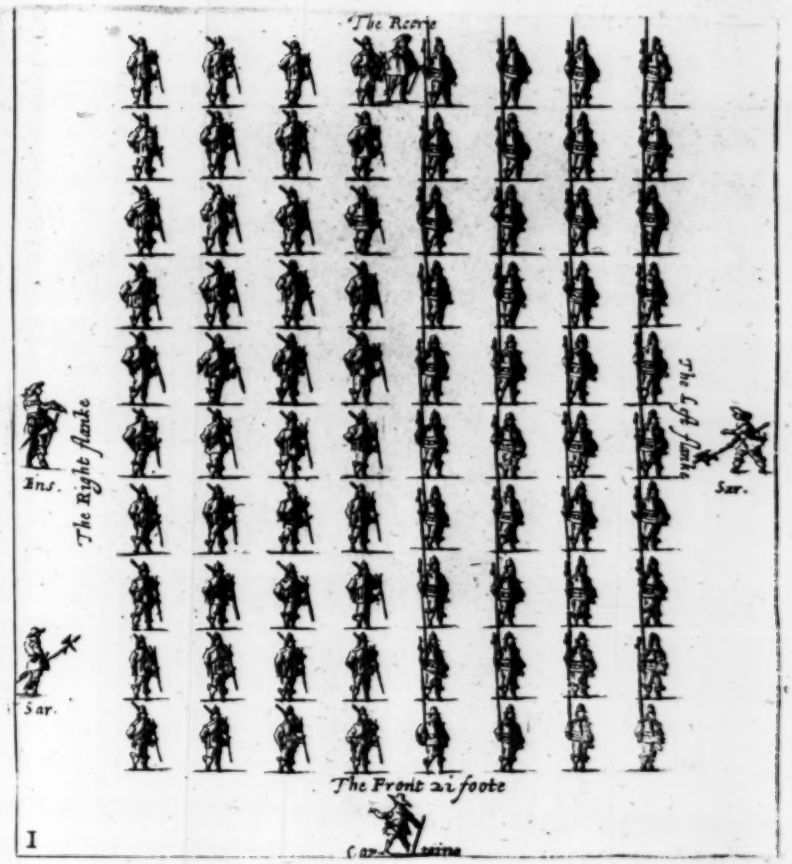
7. To the left hand.



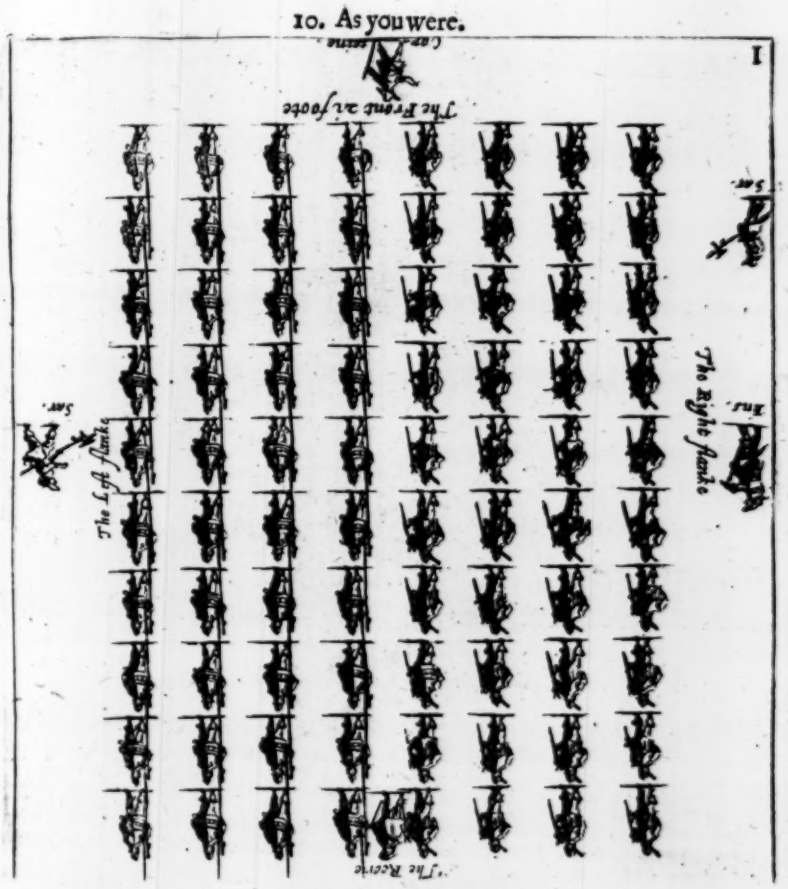
8. As you were.



9. To the right hand about.



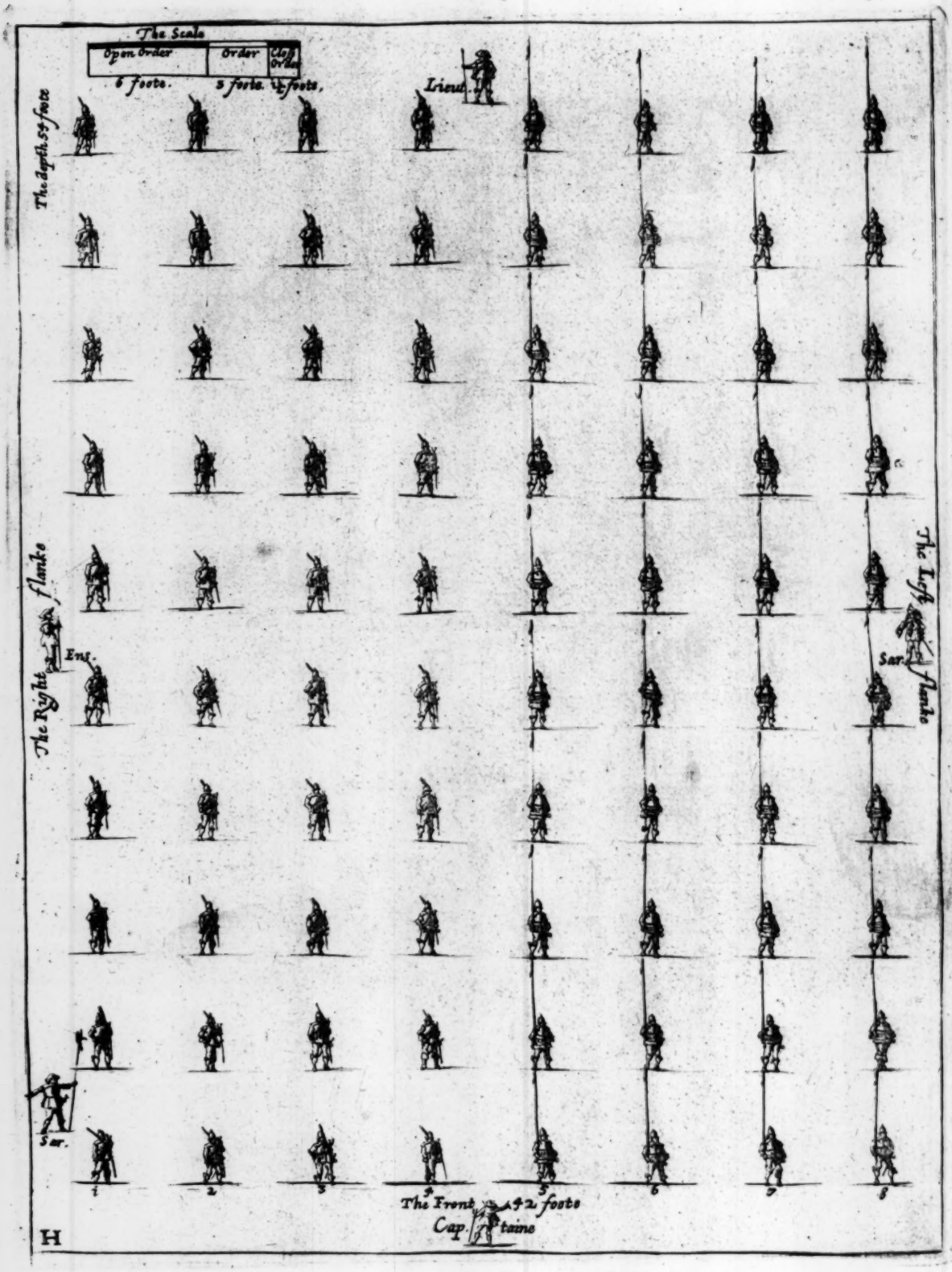
10. As you were.

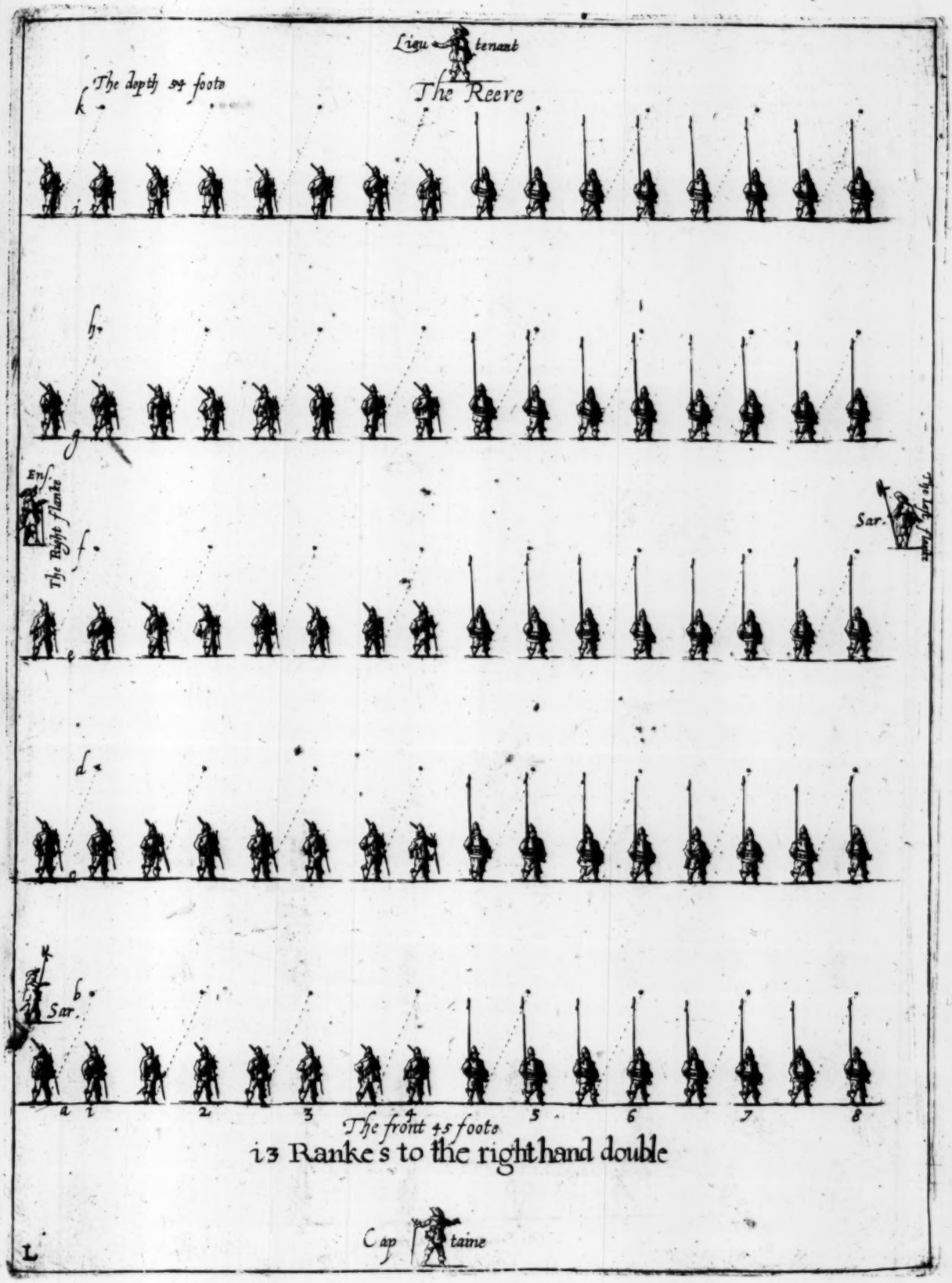


11. To the left hand about.

12. As you were, that is, as they ſtand in the figure aboue, marked letter I.

OBserve that the pages following, will beare the next motions in their *open order* of sixe foote in square, as this figure represents.

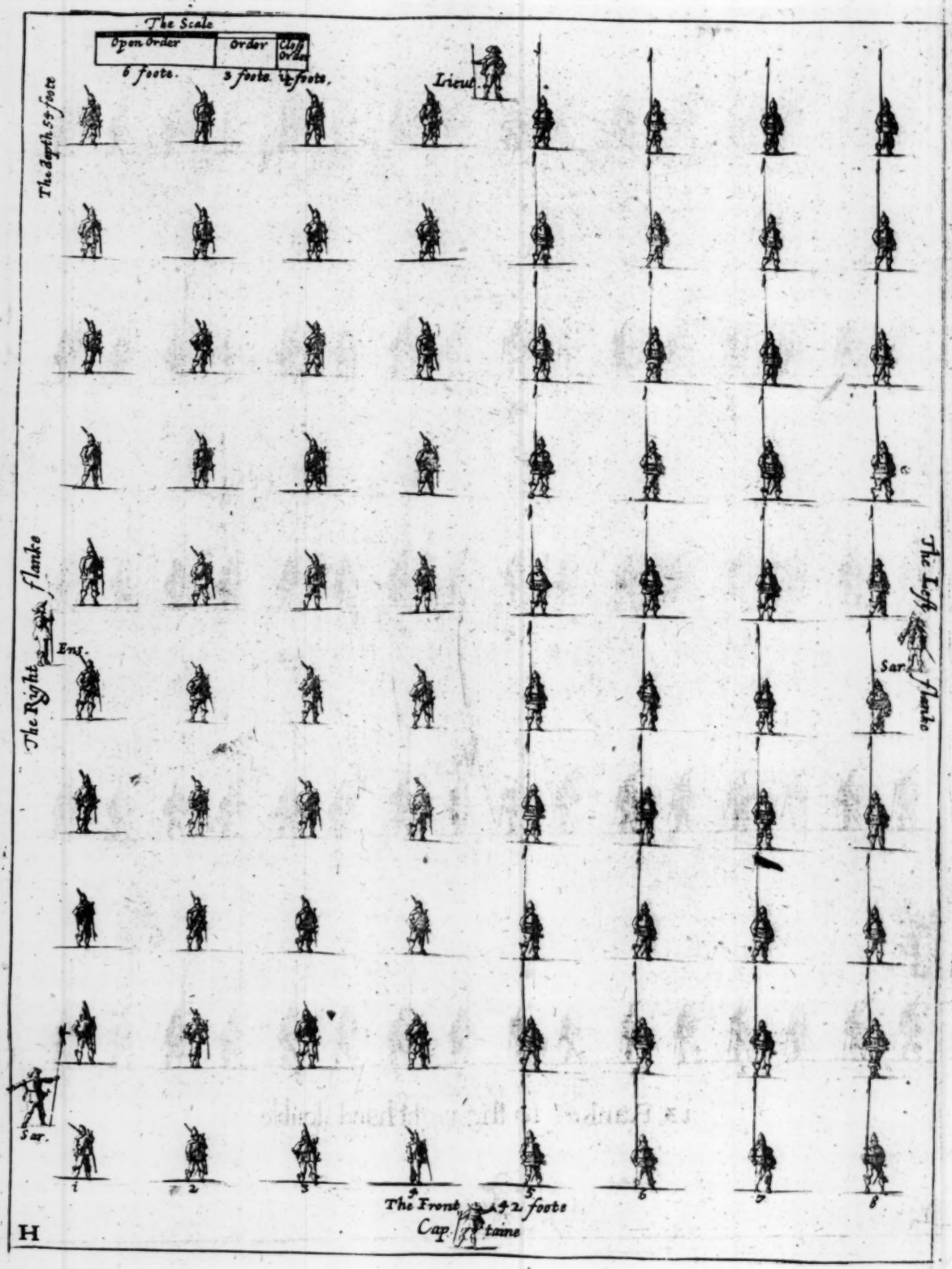


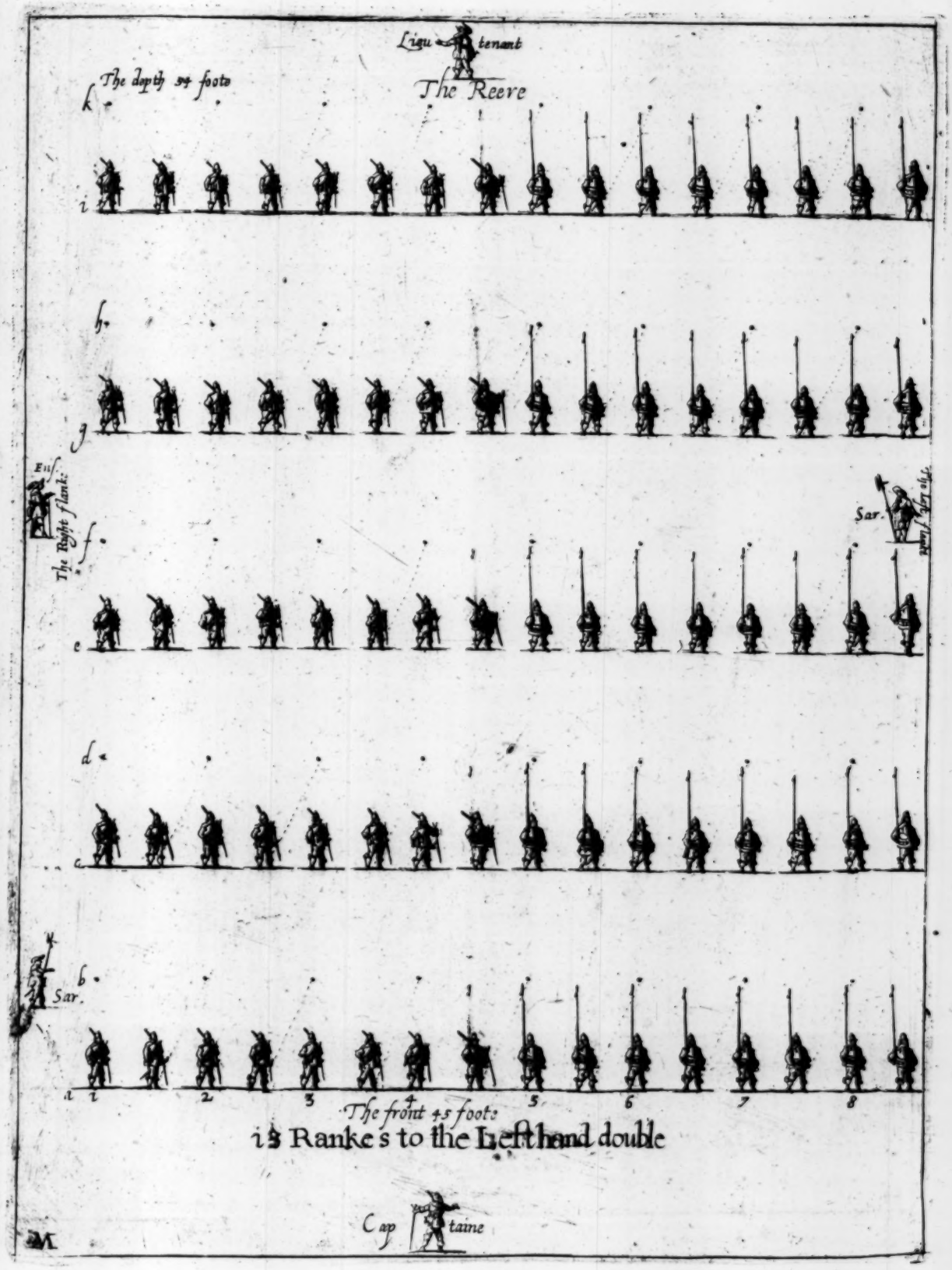


The Demonstration.

The 2. 4. 6. 8. & 10. Ranke from the Front marked with the Letters b. d. f. h. & k. moues *all* together and doubles into their order on the right hand of the files numbred 1. 2. 3. 4. 5. 6. 7. & 8. makeing 5. Rankes at their double open order of 12. foote, & 16. men in each Ranke as is ſeene in this figure aboue.

14. As you were.

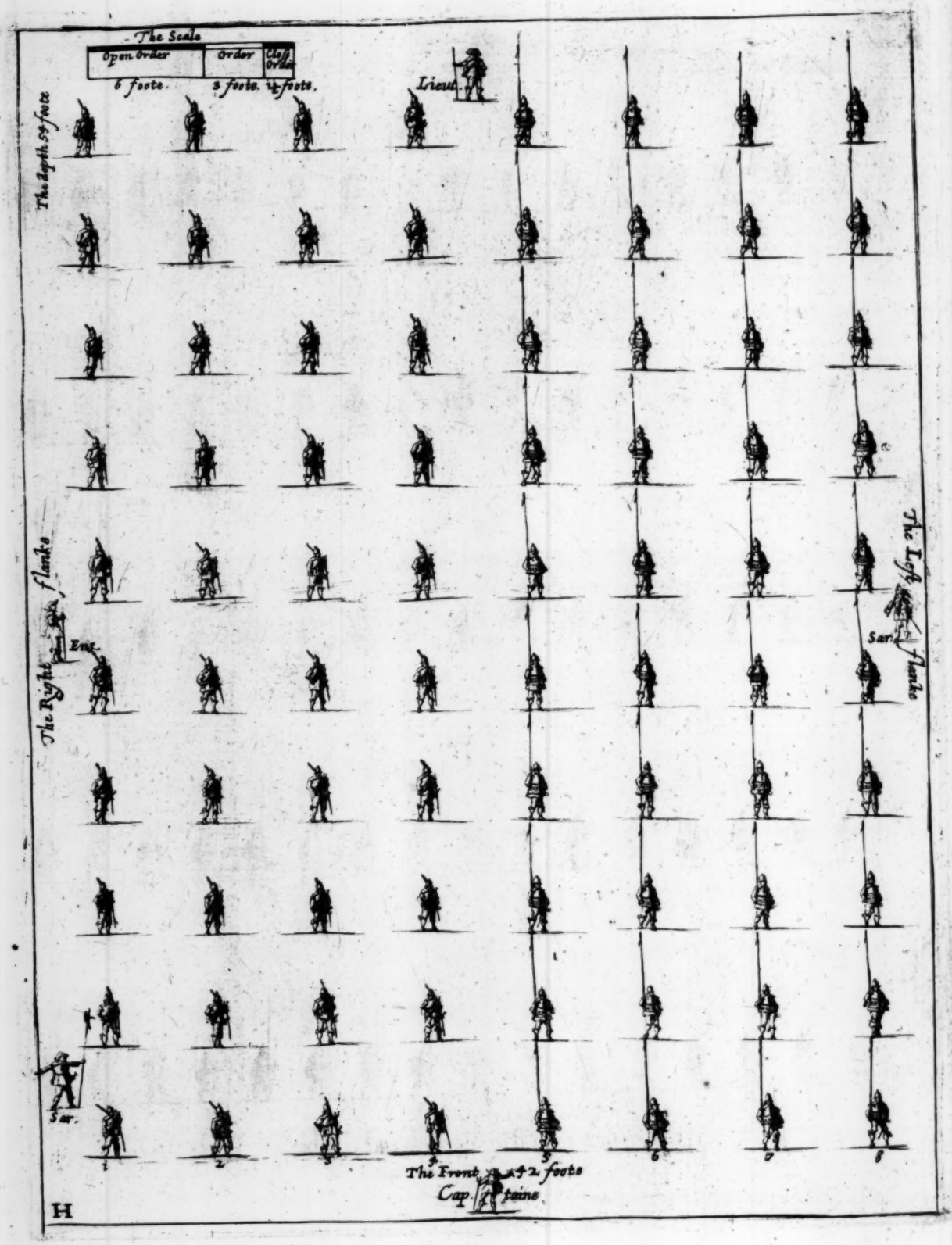

The Scale
Open Order
Order
Close Order
6 foote.
3 foote.
1½ foote.
Lieut.
The depth 54 foote
The Right flanke
Ens.
The Left flanke
Sar.
Sar.
1
2
3
4
5
6
7
8
The Front 142 foote
Captaine
H

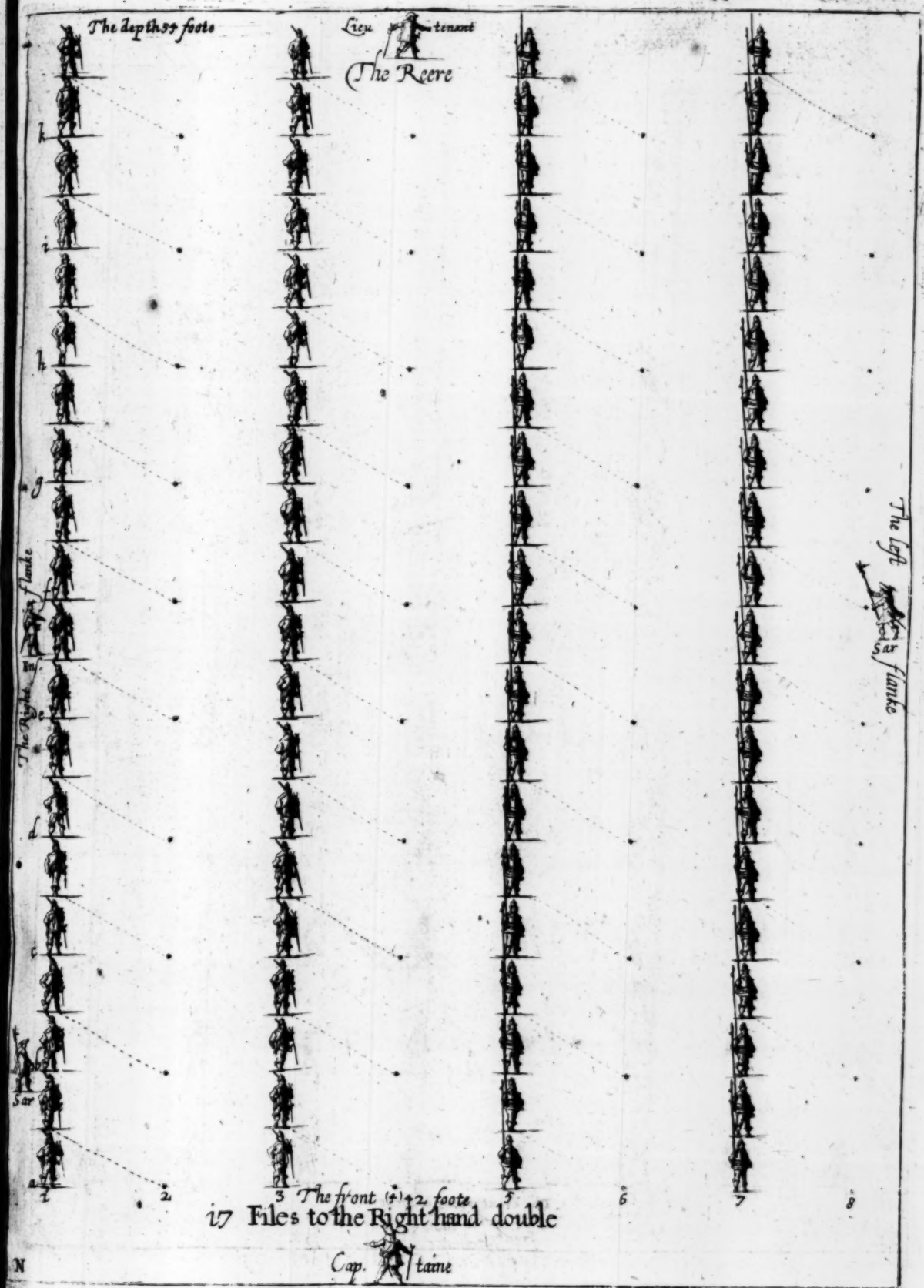


The Demonstration.

This motion differs not from the former; but onely that the vtmost man of the second Ranke, and subsequently all the other rankes, which moued before comes now vp together to their order on the left hand, of the files numbred. 8. 7. 6. 5. 4. 3. 2. & 1.

15. As you were.


The Scale
Open Order
Order
Close Order
6 foote.
3 foote.
1½ foote.
Lieut.
The depth 8 foote
The Right flanke
Ens.
The Left flanke
Sar.
Sar.
1
2
3
4
5
6
7
8
The Front 42 foote
Captaine
H

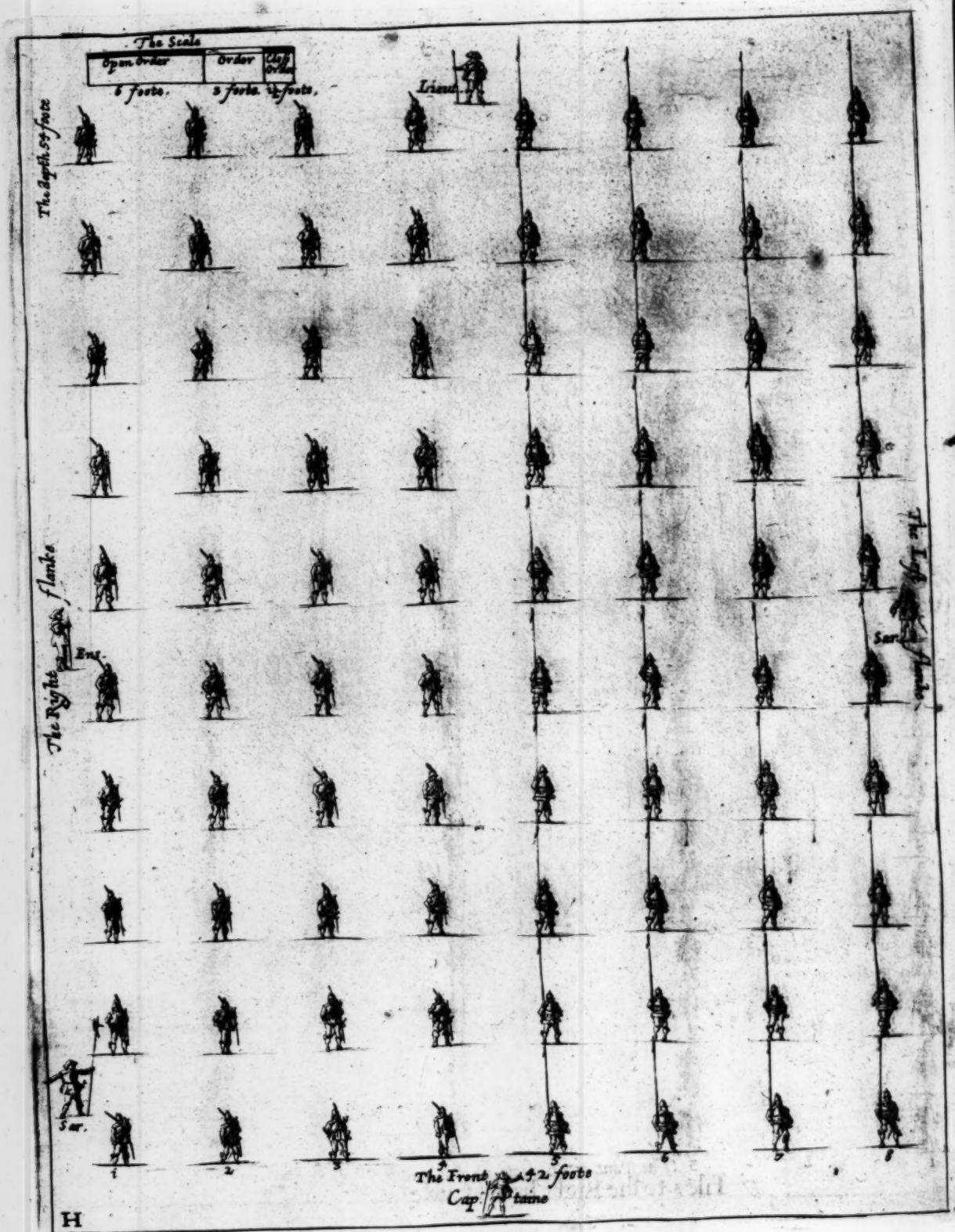


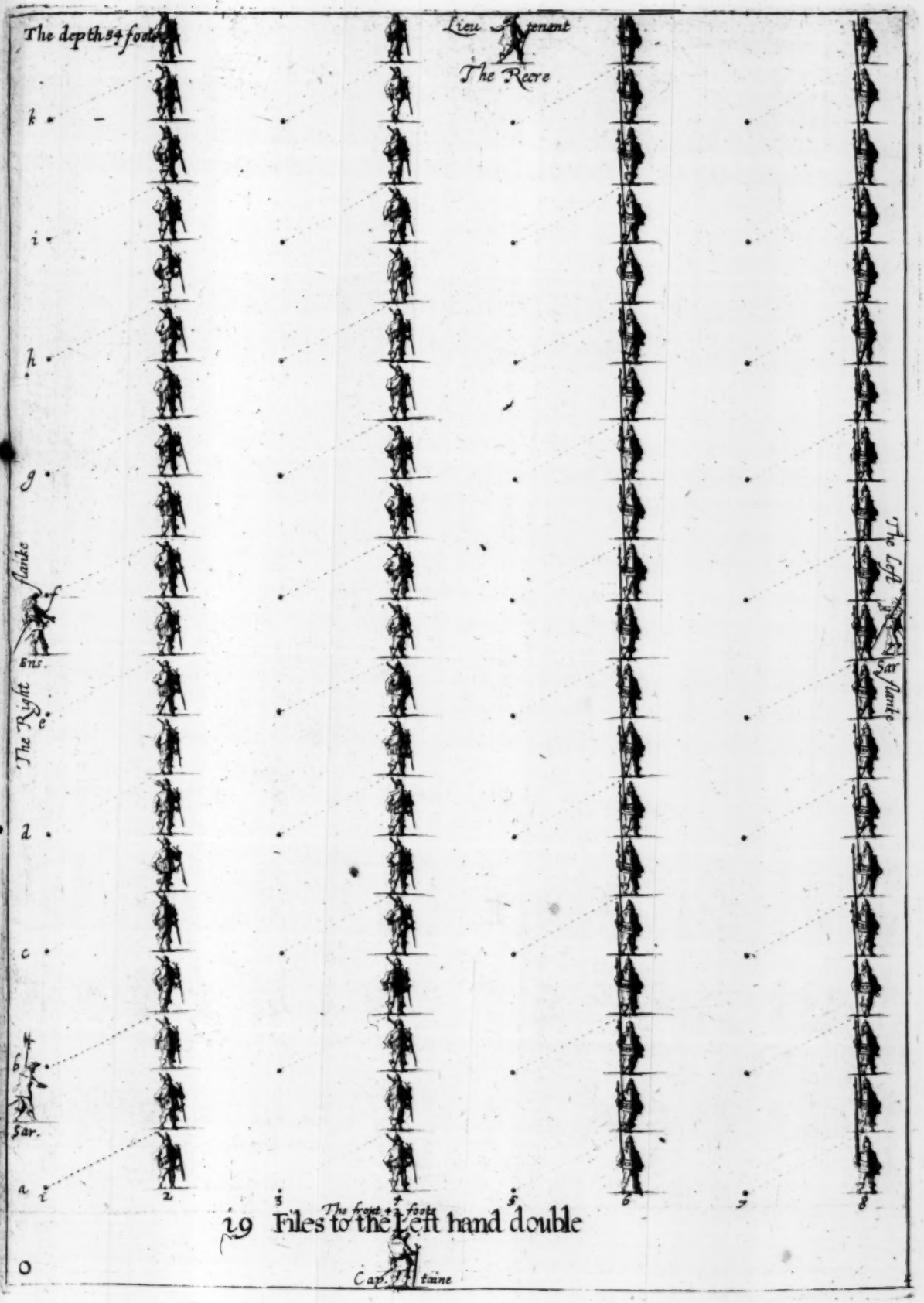
The Demonstration.

The 2. file (next the right hand) moues & fals back betweene the right hand file, the 4. th file betweene the 3. The 6. th betweene the 5. th and the 8. th (or left hand file) betweene the 7. th file, all to their order, makeing foure files 20. men deepe, and 12. foote distance betwixt file and file, as in this figure.

17. As you were.

The


The Scale
Open Order
Order
Close Order
6 foote.
3 foote.
1½ foote.
Lieut.
The depth 5 foote
The Right flanke
Ens.
Ser.
The Left flanke
Ser.
1
2
3
4
5
6
7
8
The Front 42 foote
Captaine
H

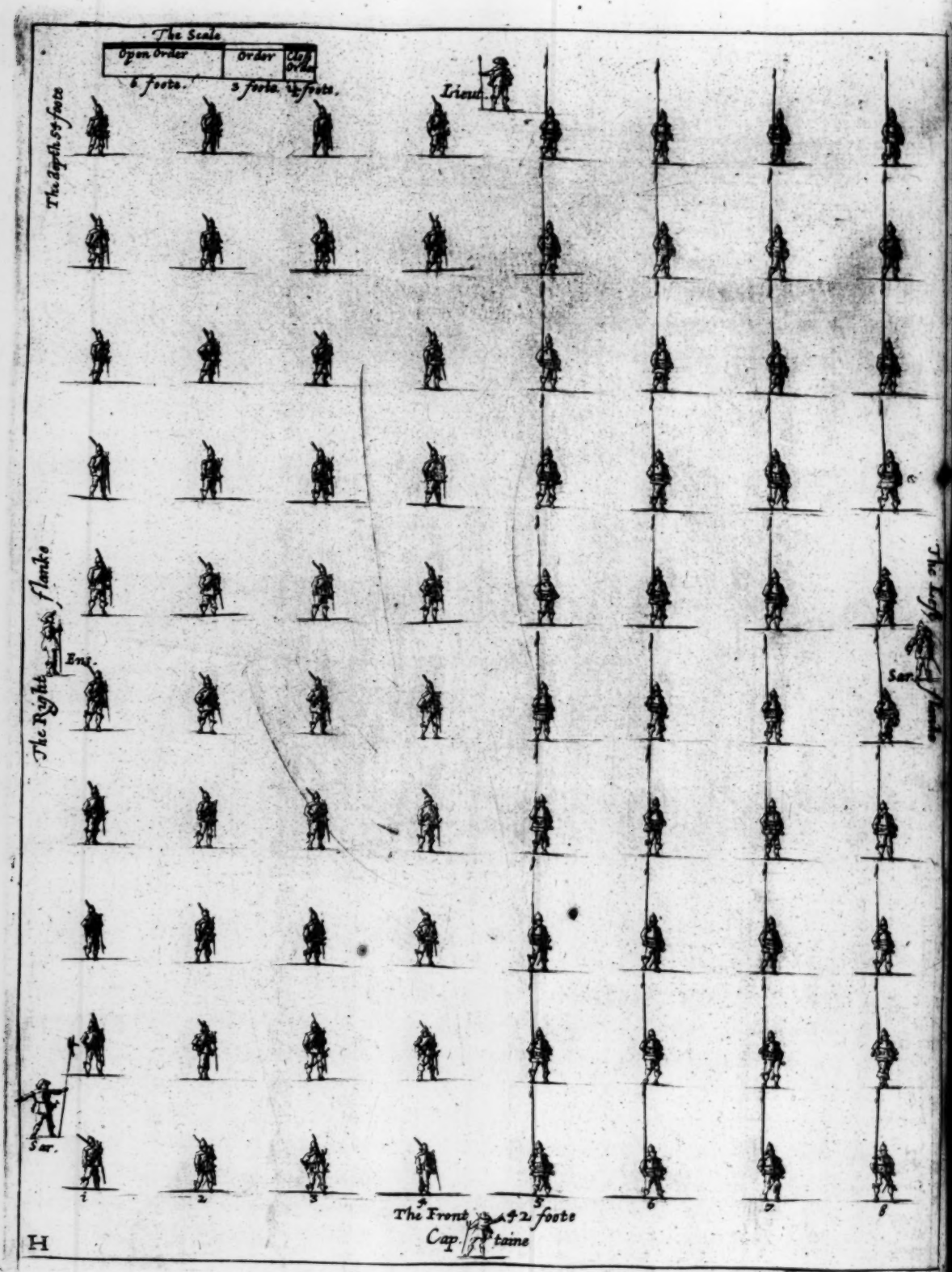


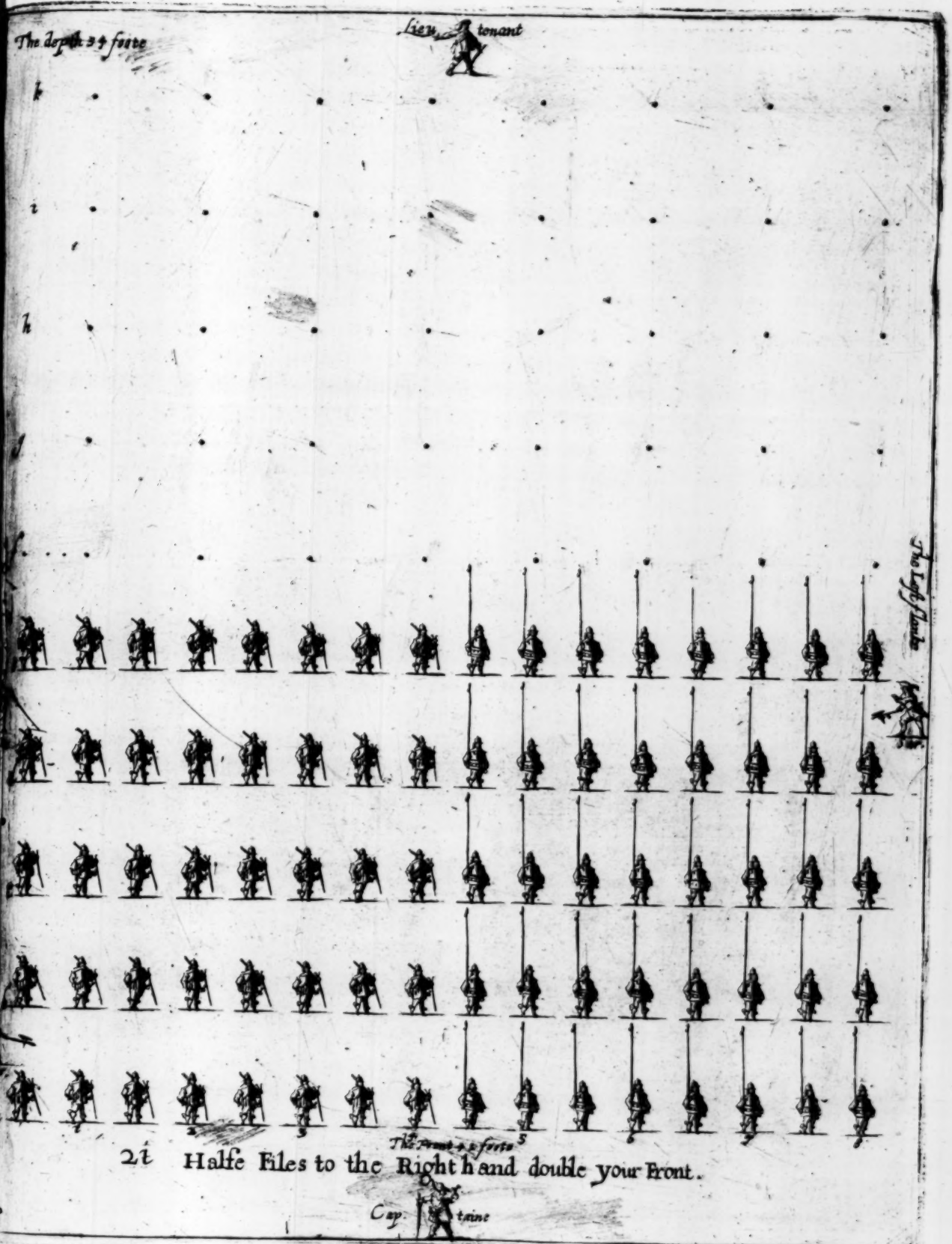
19 Files to the Left hand double

The Demonſtration.

The files which moued before ſtand now ſtill, and the 2. file next the left hand file, falls back betweene the left hand file: the 5 th file betweene the 6. th the 3. betweene the 4. th and the 1. (or right hand file) betweene the 2. file makeing 20. men deepe, and 12. foote diſtance betwixt file and file as before.

19. As you were.


The Scale
Open Order
Order
Close Order
6 foote.
3 foote.
1 foote.
Lieut.
The depth 8 foote
The Right flanke
Ens.
The Left flanke
Ser.
Ser.
1
2
3
4
5
6
7
8
The Front 42 foote
Captaine
H

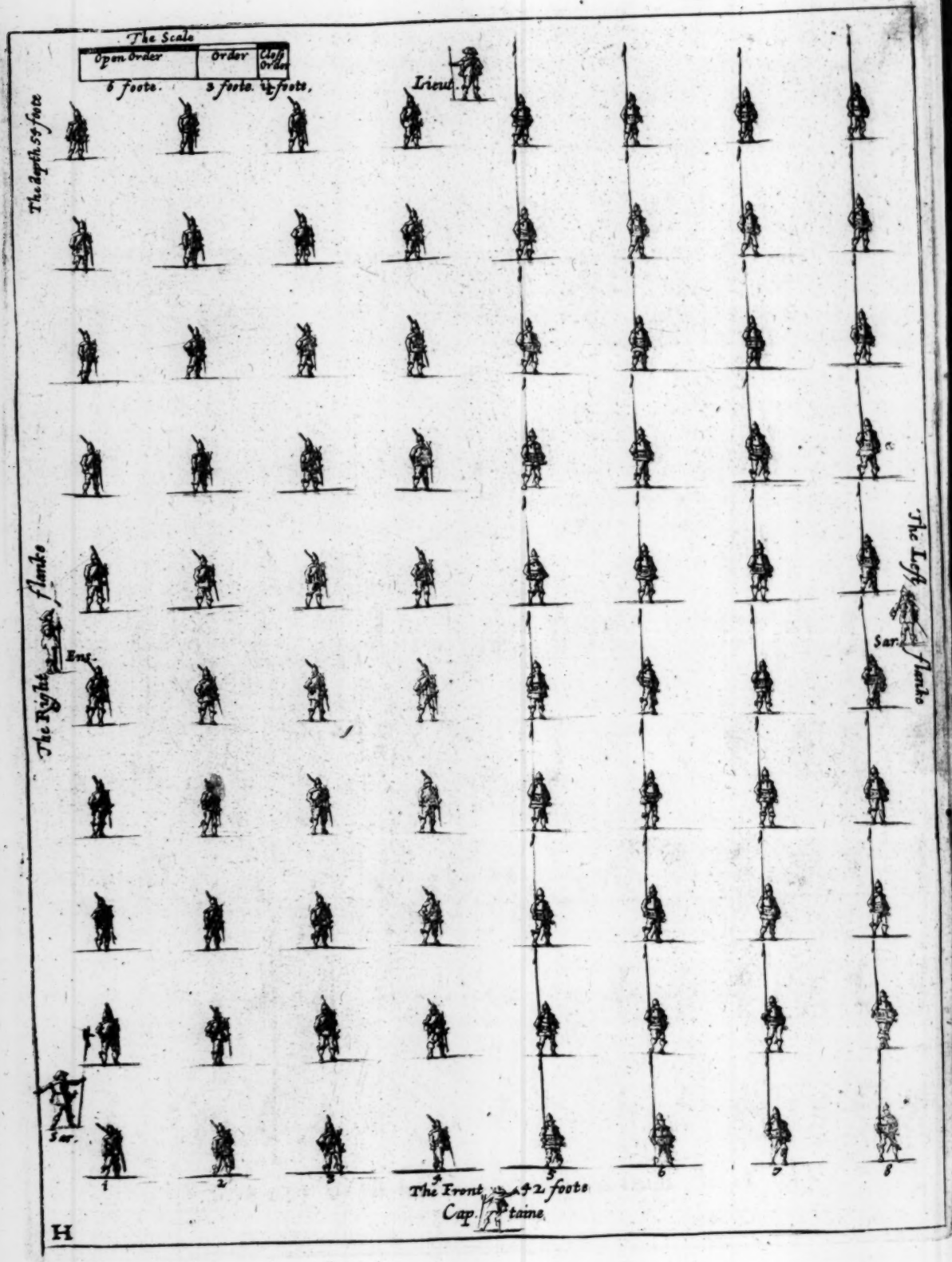


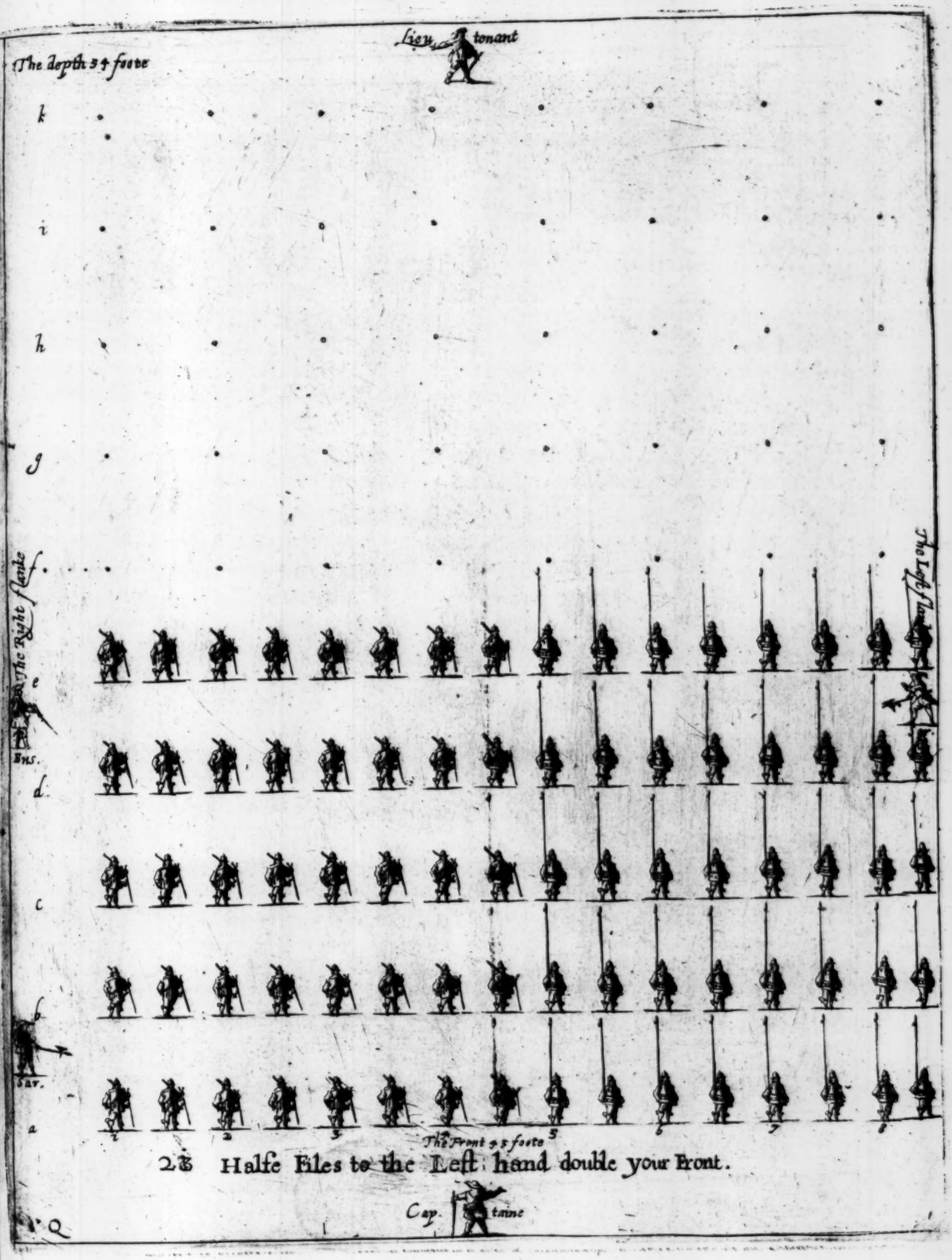
21 Halfe Files to the Right hand double your Front.

The Demonſtration.

The leader of the halfe file on the right hand, (noted f) ſtepps to his order beyond the right hand file number 1. and alſo all the reſt of the files ſtepping to their order on their right hand comes vp together betweene the files numbred 1. & 2. 2. & 3. 3. & 4. 4. & 5. 5. & 6. 6. & 7. 7. and 8. into the rankes marked a. b. c. d. and e. at their order of three foote diſtance in file, and 6. in ranke, as this figure aboue showes.

21. As you were.


The Scale
Open Order
Order
Close Order
6 foote.
3 foote.
1½ foote.
Lieut.
The depth 5 foote
The Right flanke
Ens.
Ser.
The Left flanke
Ser.
1
2
3
4
The Front
5
42 foote
6
7
8
Cap. taine
H

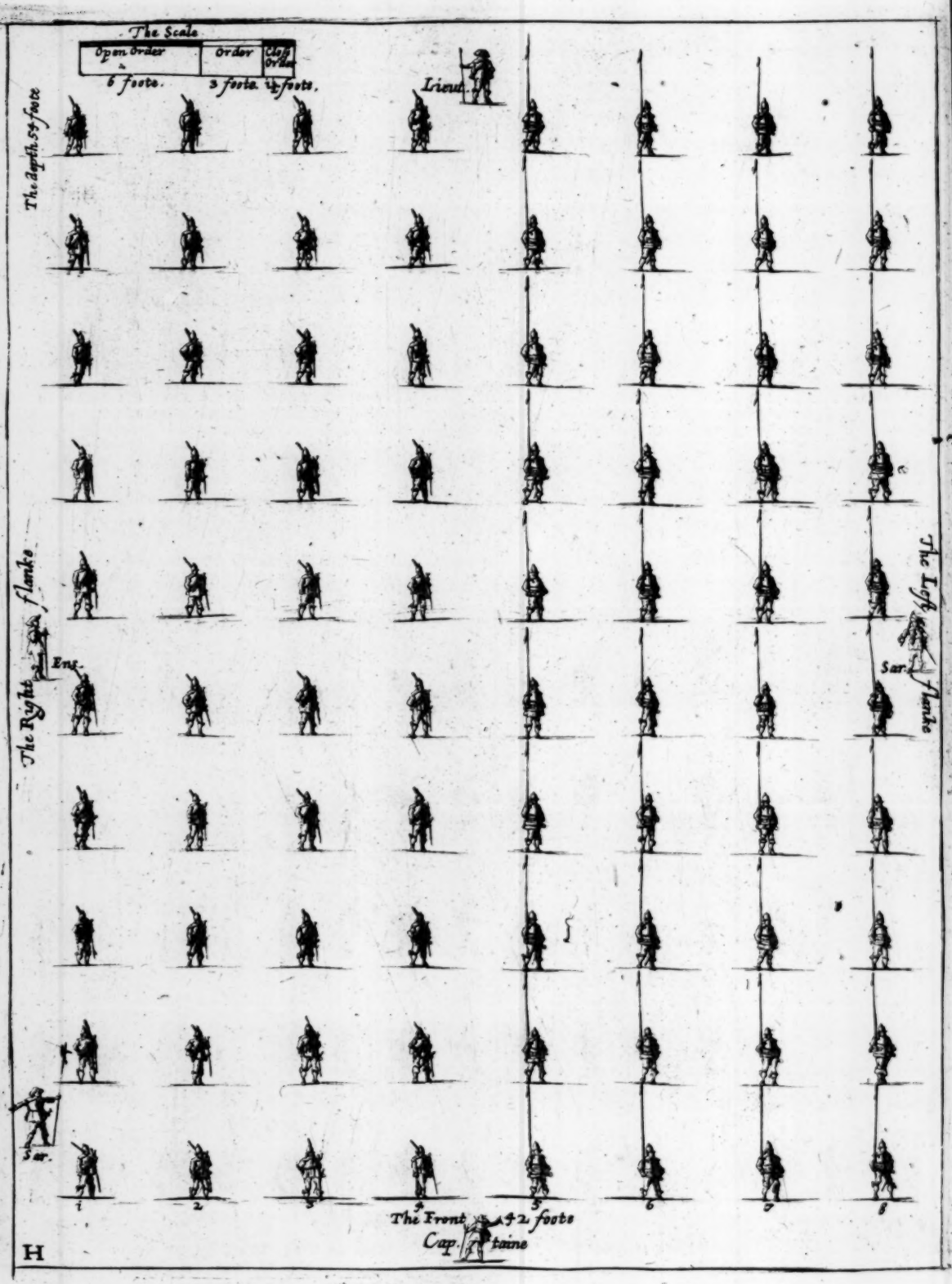


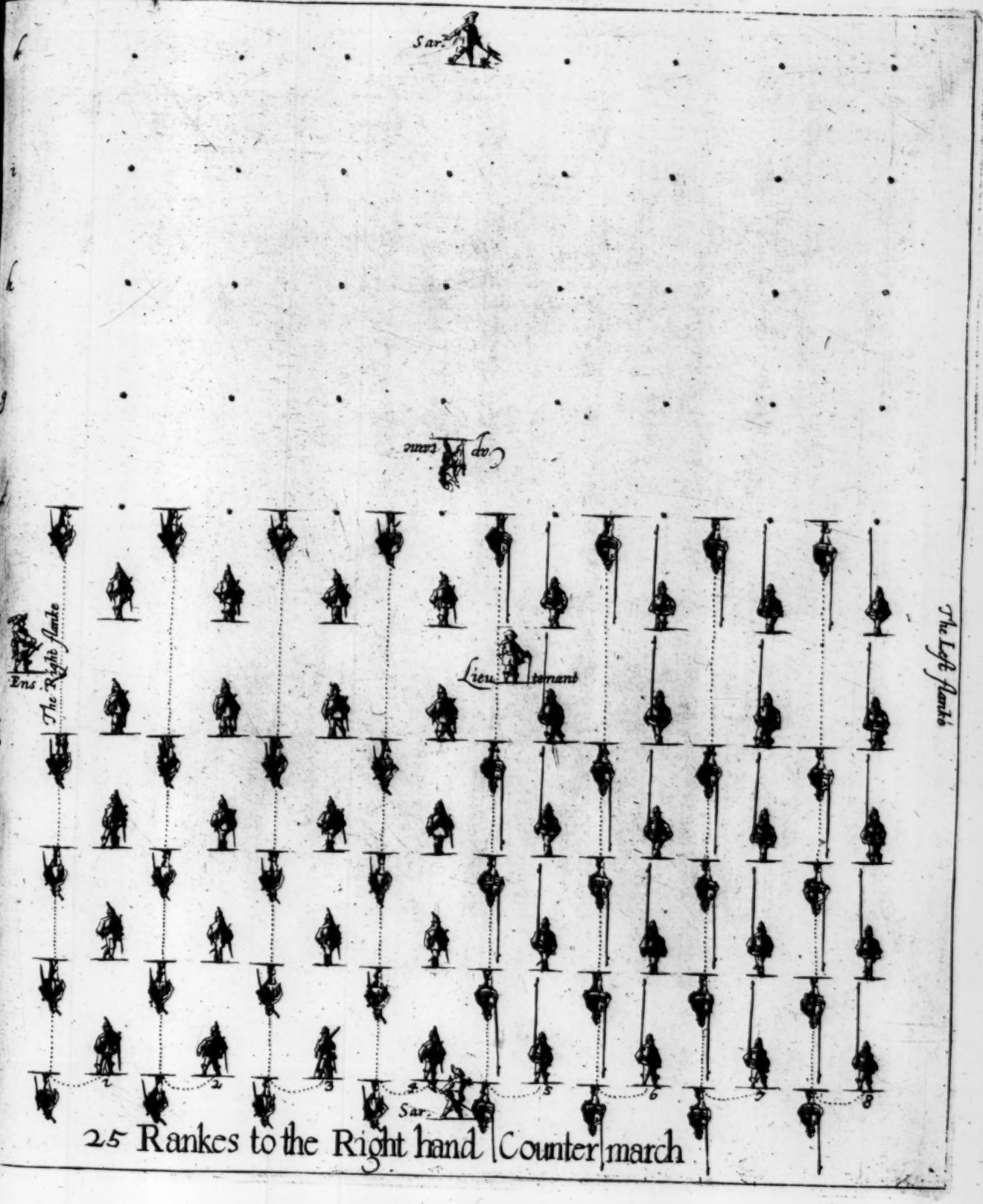
22. Halfe Files to the left hand double your front.

The Demonſtration.

This motion differs not from the other, but that the leader of the halfe-file on the left hand, and conſequently all the reſt of the files, ſteps to their order on the left hand, and comes vp together betweene the files numbred 8. & 7. 7. & 6. 6. & 5. 5. & 4. 5. & 3. 3. & 2. 2. & 1. into the rankes marked (as before) with the letters a. b. c. d. & e.

23. As you were.


The Scale
Open order
Order
Close Order
6 foote.
3 foote.
1½ foote.
Lieut.
The depth 5 foote
The Right flanke
Ens.
The Left flanke
Sar.
Sar.
1
2
3
4
5
6
7
8
The Front 42 foote
Cap. taine
H

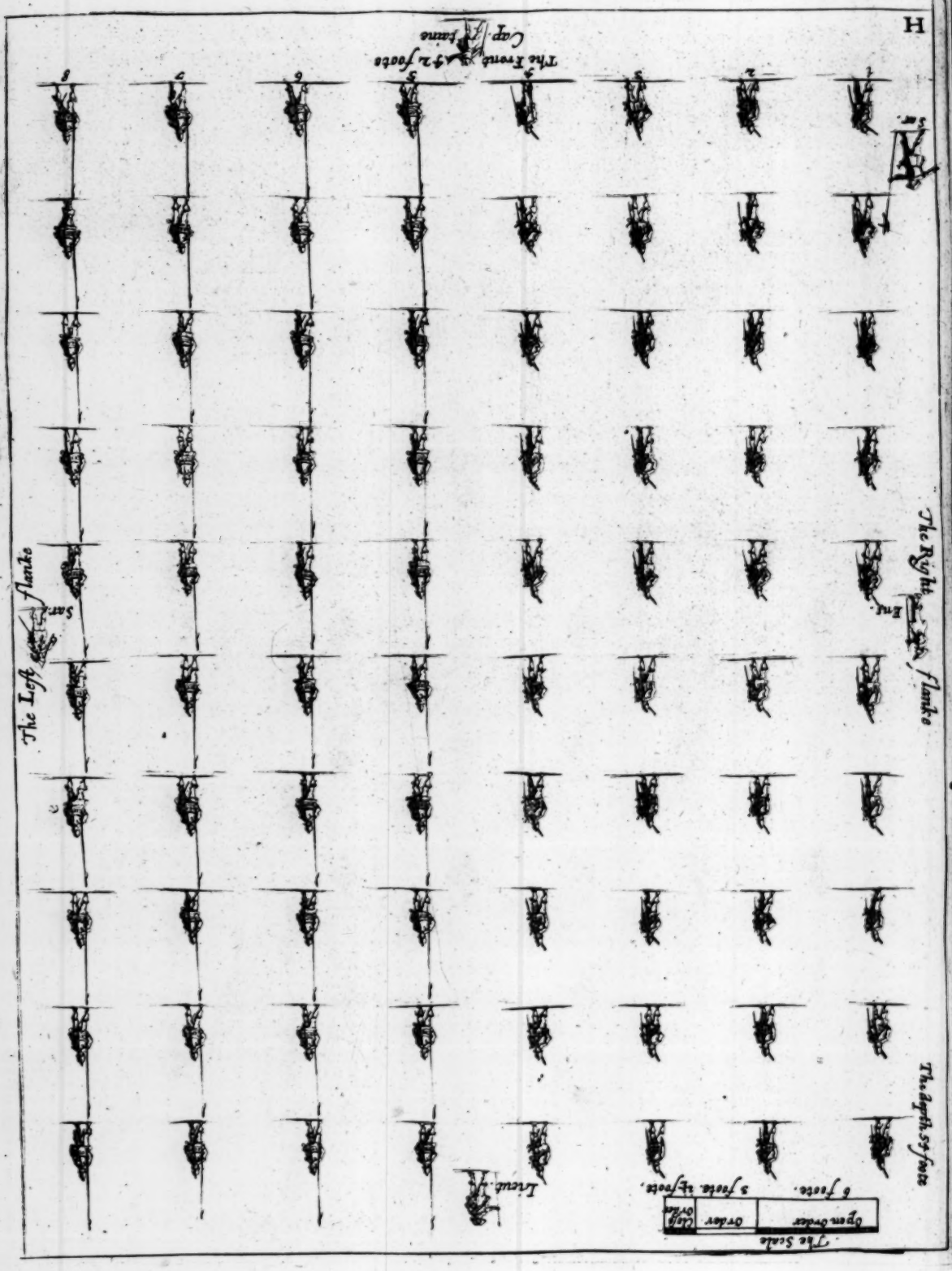


25 Rankes to the Right hand Counter march

The Demonſtration.

When you will Countermarch to the right hand, the firſt Ranke of Leaders numbred 1. 2. 3. 4. 5. 6. 7. and 8. onely muſt advance one ſtepp forward with the right legg, and then turne, and all the other Rãkes muſt march firſt vp to the place, from whence the firſt ranke did countermarch before they turned where the Sariant ſtands marked with a ſtarre. This figure ſhewes that betweene the rankes a and d. there are 8. rankes mett at their order, and the Captaine countermarching to the Reere, with the firſt Ranke of Leaders, to the 6. ranke marked f. and the Lieutenant, with the ranke of bringers vp noted K. towards the front to the ranke noted e, which repreſents the Counermarch incompleate, as is ſeene in this figure aboue.

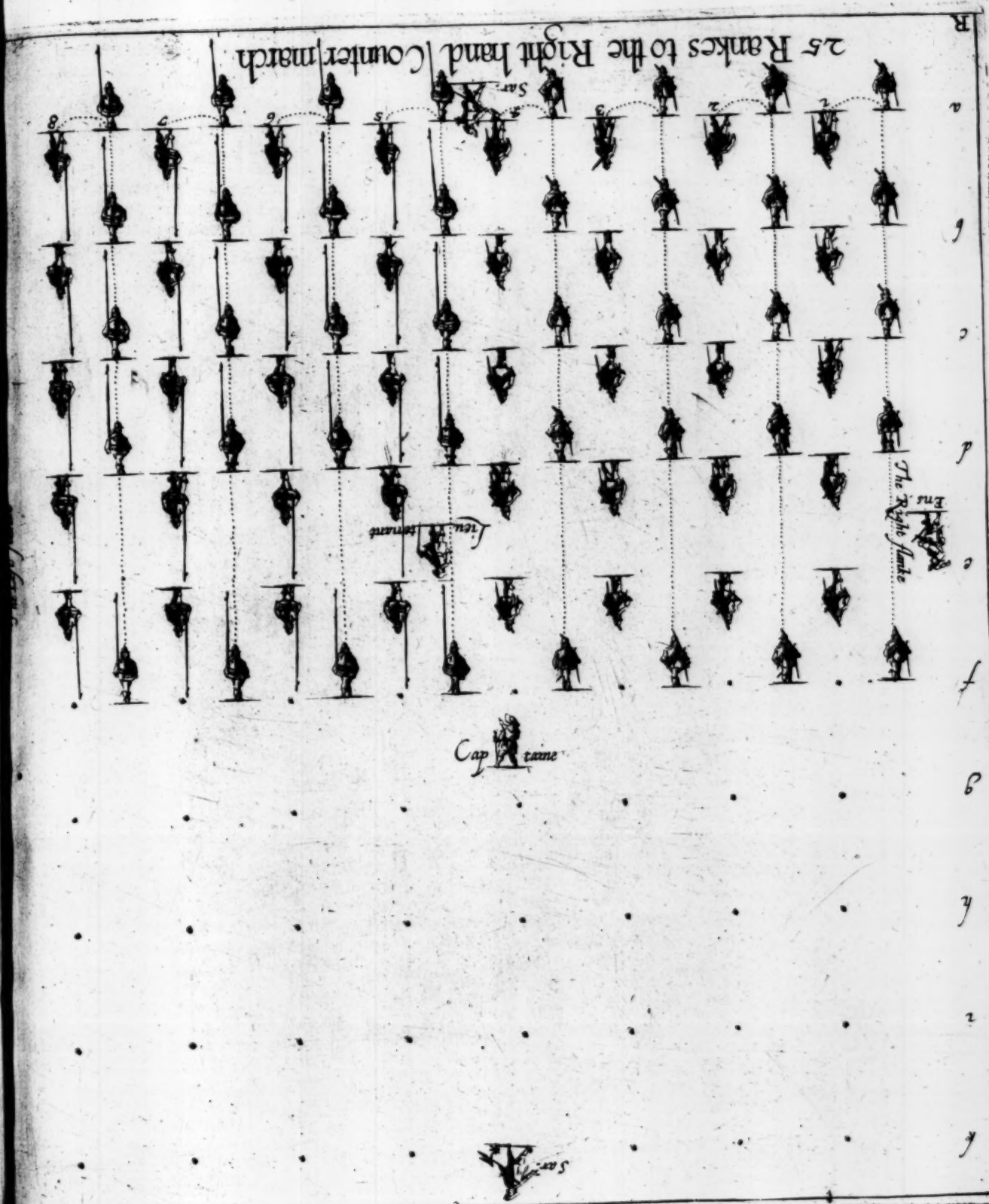
This figure showes the Countermarch compleate, when the Captaine (or officer) is come with the first Ranke of Leaders to the place, where the bringers vp, and the Lieutenant stood, and the Lieutenant with the bringers vp to the Captaines place, standing in their open order in ranke and file, as this figure demonstrates.



Observe likewise, if you will now Countermarch to the left hand, the first ranke must stepp forwards one stepp with the left legge; and then turne, and all the other Rankes behinde, must come vp to that place before they turne, where the Sariant with his Halbart stands as before.

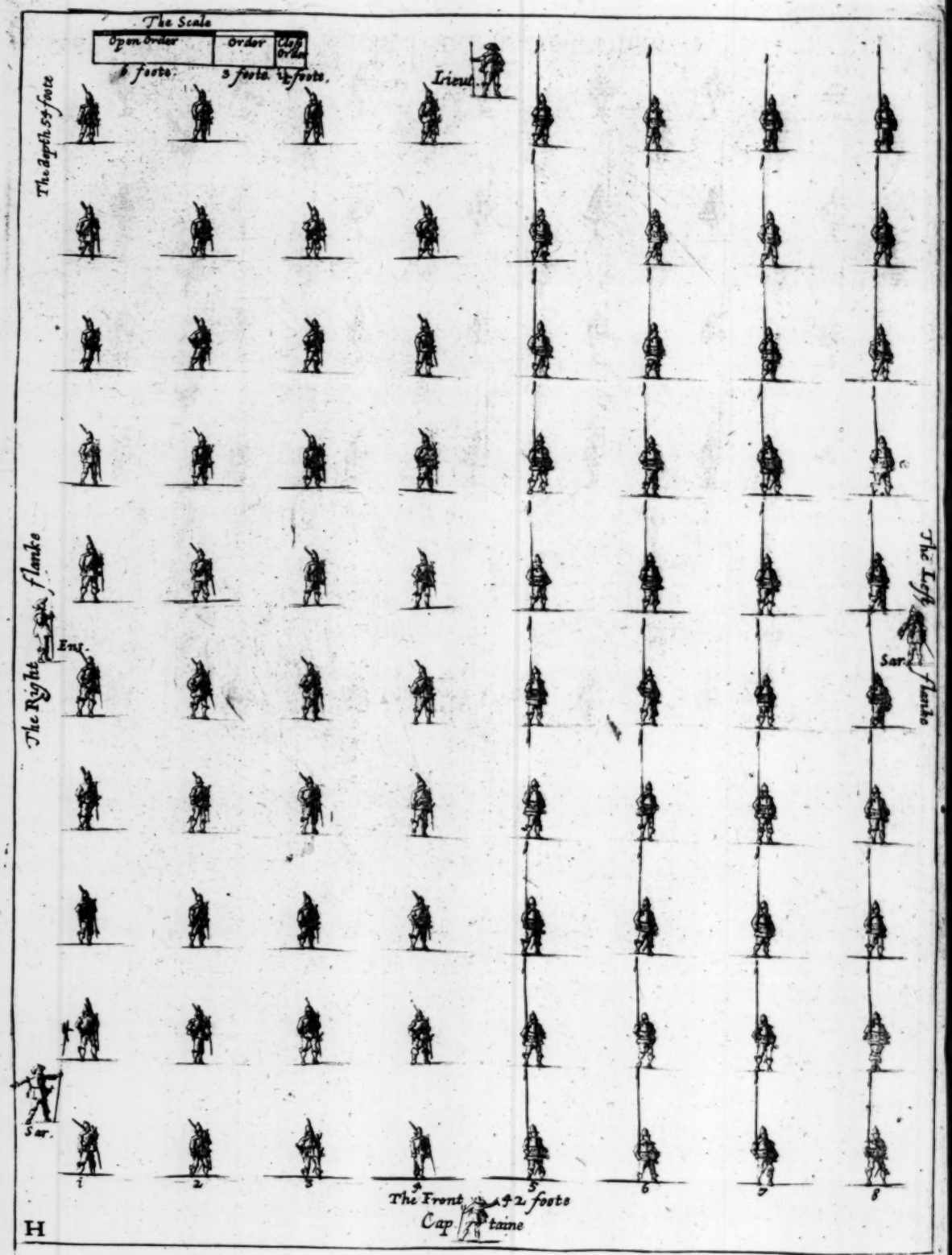
25. *Rankes to the left hand Countermarch.*

Practi-



Note that this figure (as the first) shewes the Countermarch incompleatoas before.

The



The Demonſtration.

This figure showes, that the Captaine is countermarcht vp with the firſt ranke of leaders into that place, where the front ſtood before, and euery ranke and file in their open order.

The like countermarch is per formed, either on the right, or left hand flanke, by giving firſt this word of command, *To the right*, or *left hand*, omitting the naming, either of *Rankes*, or *Files*, in ſaying onely, *To the right* or *left hand countermarch*, which you liſt.

The

Obſervations before you wheele.

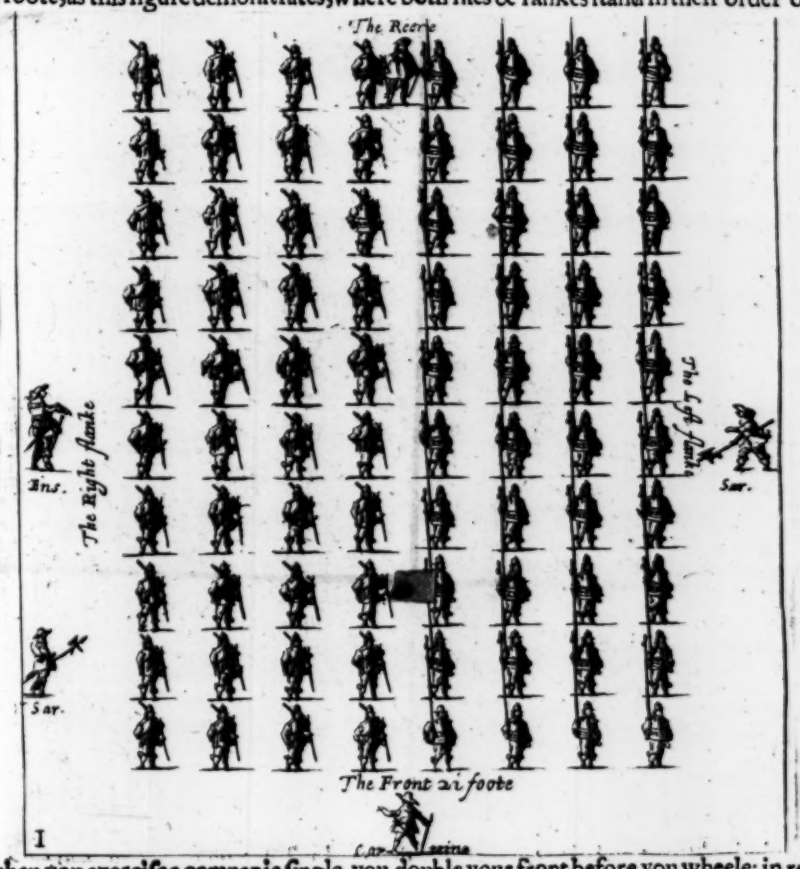
First { *Files to the right,* / or *left hand,* or *to* / *the middle,* } Cloſe to your order { To 3. foote betweene / File and file.

If you would cloſe your files to the right hand, the outermoſt file on that hand ſtands ſtill, and the next on the right hand, (numbred 2.) movcs firſt to their order, and then all the files ciphred 3.4.5.6.7.& 8. the left hand file, cloſes in all to their order. And if you would have them cloſe to the left hand, the outermoſt file alſo on that hand ſtands ſtill, and then the file next the left hand (numbred 7.) moves firſt, and afterward all the other files, noted 6.5.4.3.2.& 1. (or the right hand file) cloſe all to their order.

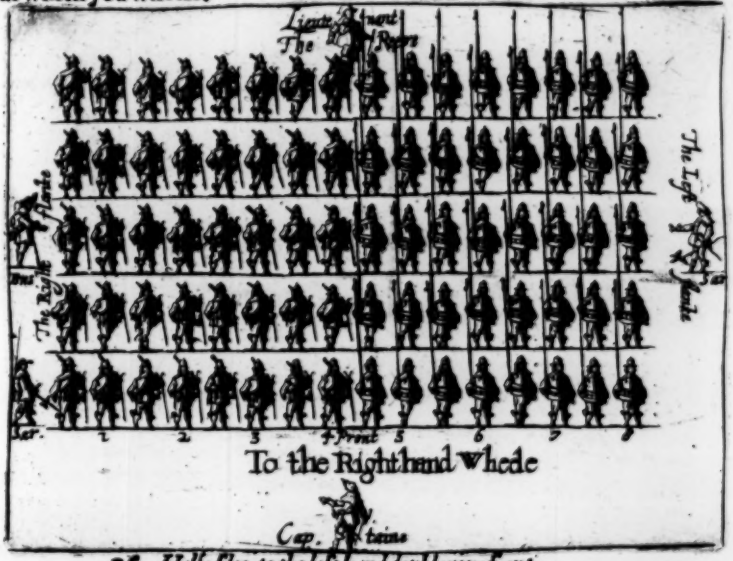
But if you deſire to have your files cloſe to the *middle*, then the two middlemoſt files numbred 4. and 5. cloſſe firſt to their order of three foote, and having their diſtance, the other files numbred 2.3 & 1. on the right hand, and the files 8.7.& 6. on the left hand cloſes both waies into their order.

Secondly { *Rankes to your* / *Order Cloſe* } that is, { To three foote betweene Ranke / and Ranke.

Note, that in this motion alſo the *Rankes*, which ſtand in their open order on the other page, marked whith the Letters, b,c,d,e,f,g,h,i, and k. moving all together in an even front, comes vp to their order, or diſtance of three foote, as this figure demonſtrates, where both files & rankes ſtand in their order of three foote diſtance.



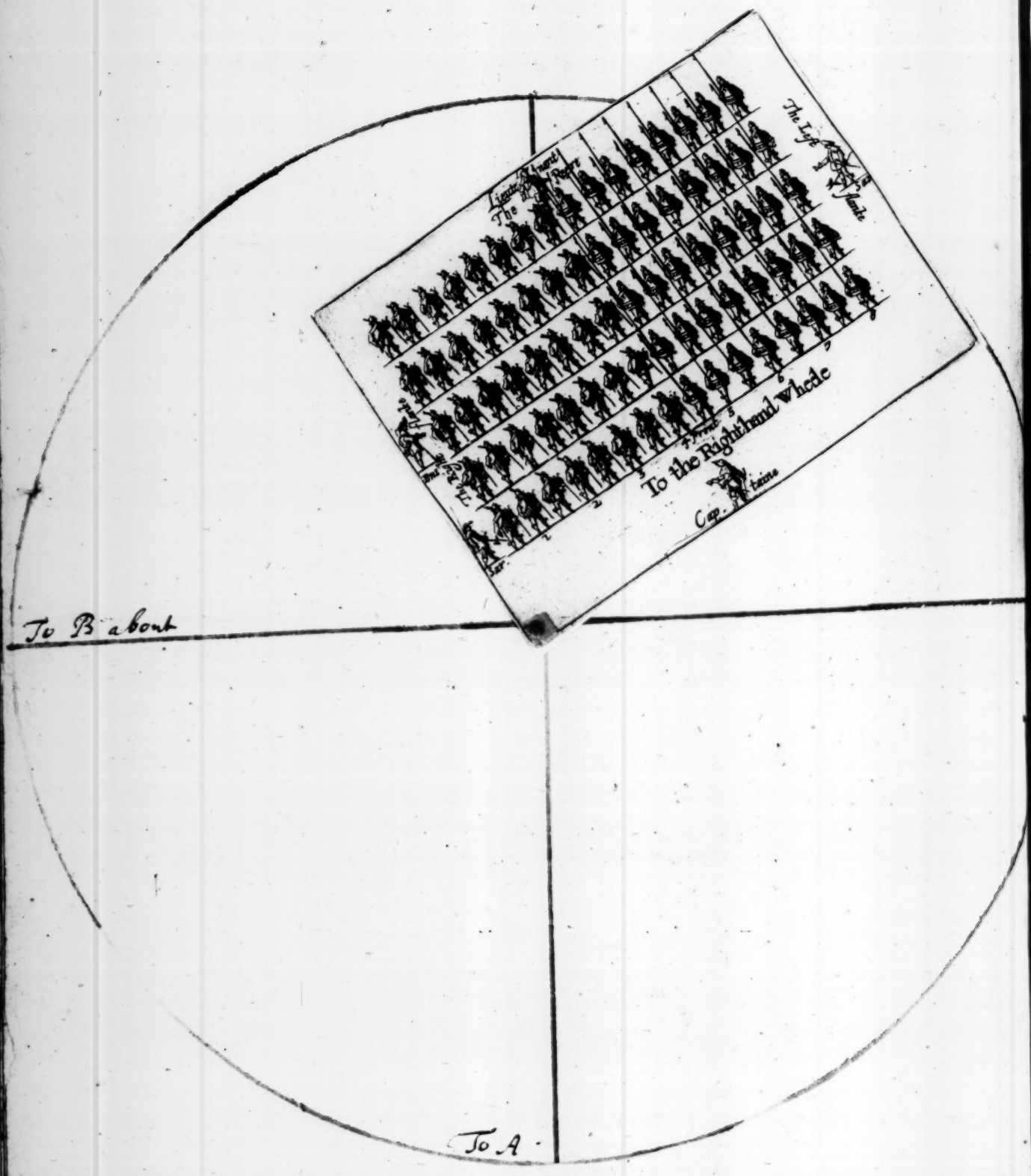
Obſerve, that when you exerciſe a companie ſingle, you double your front before you wheele; in regard the bodie is ſmal: but in a diviſion, or greater bodie: you cloſe both your rankes, and files to your order (as aboue) omitting the doubling, and then wheele: but being a ſingle companie when you wheele to the right hand, then double your front to the left hand: for ſo the leader of the right hand file, will keepe his place on that corner towards which you wheele.



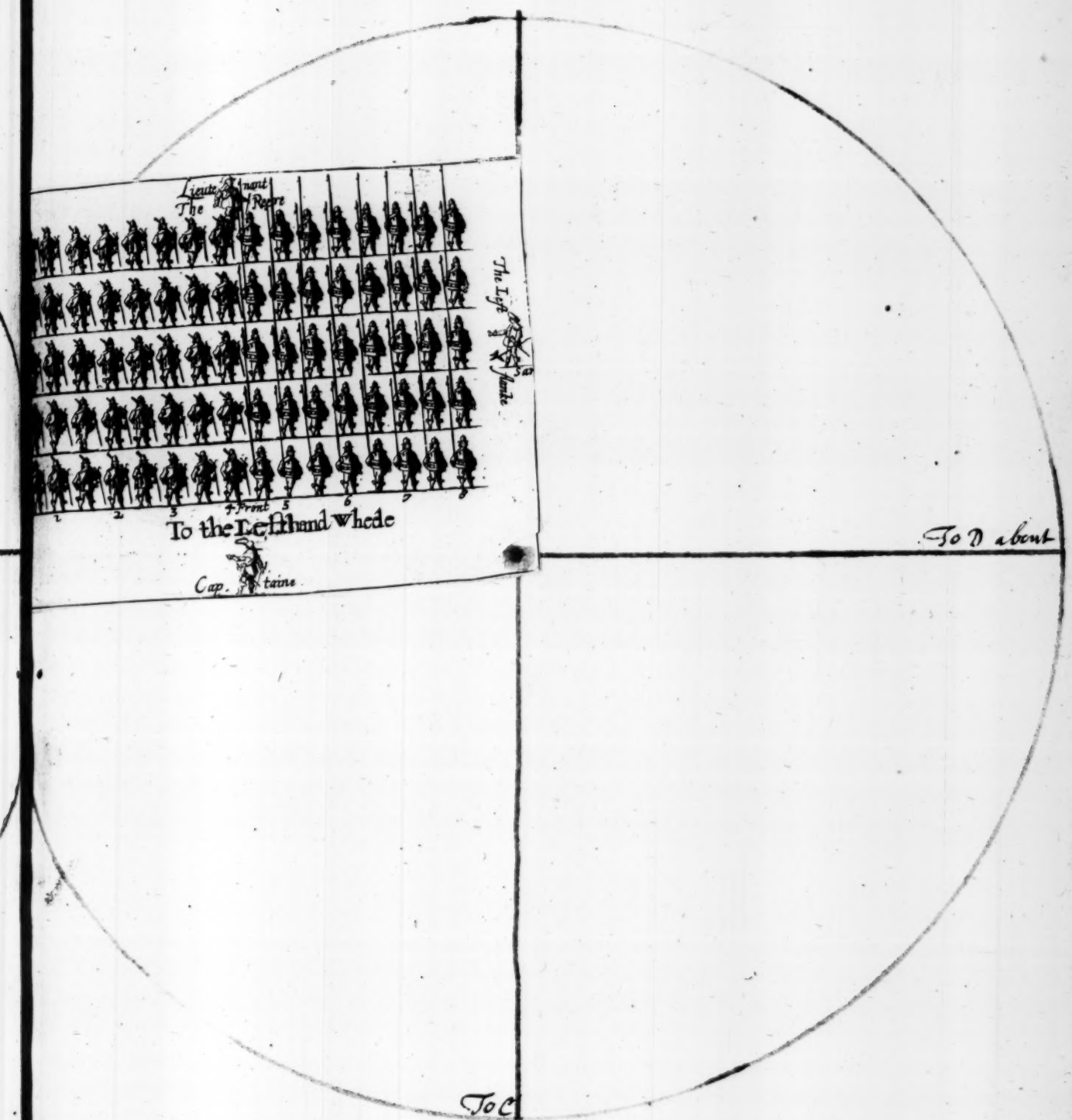
26. *Halfe files to the left hand double your front.*

The Demonſtration.

This figure before you wheele ſhewes your men to ſtand in their cloſe order in file, and their order in ranke, as boue.

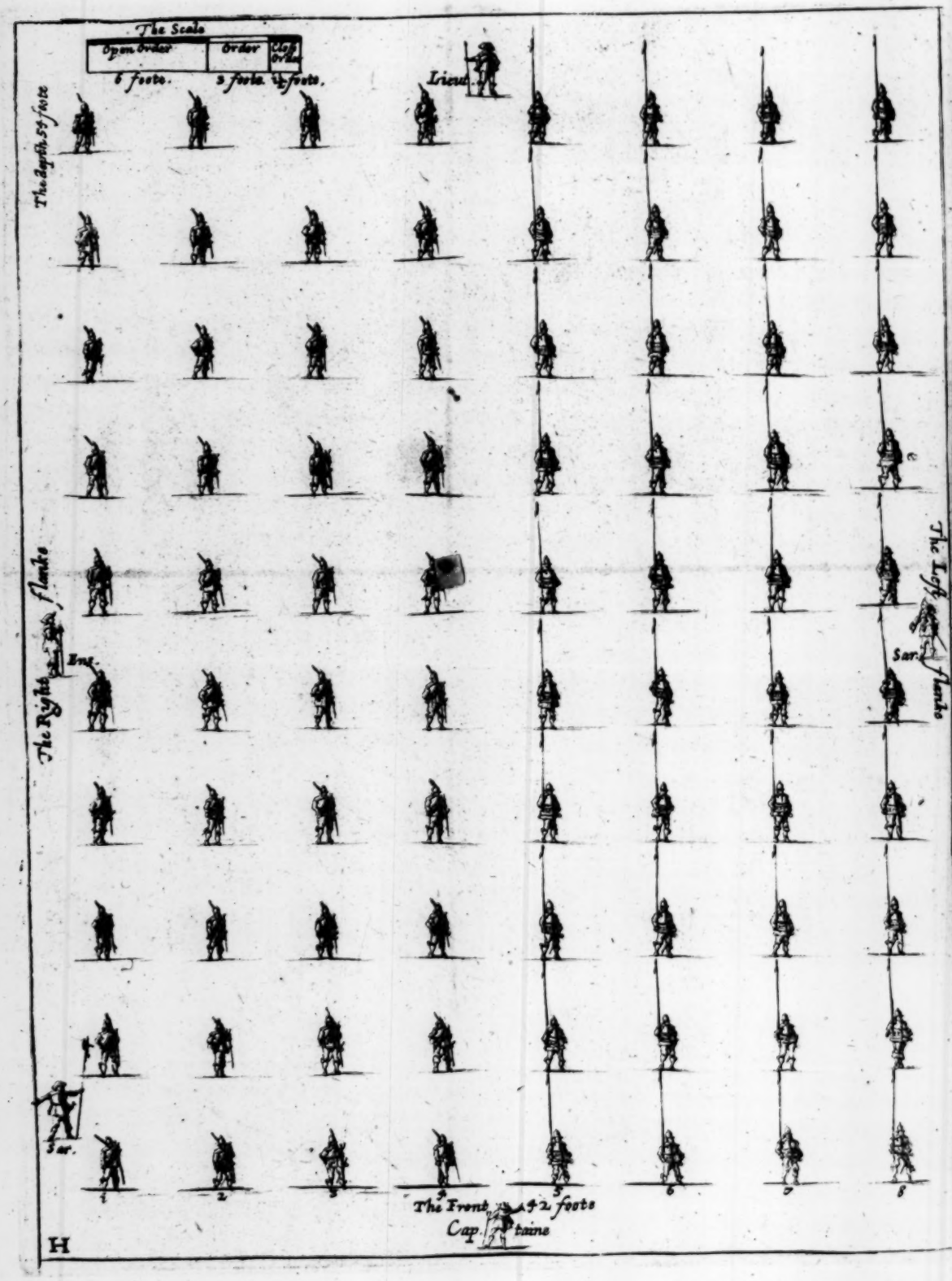

To the Right hand whede
To B about
To A

Againe when you wheele to the left hand, double your front to the right hand, and then the two leaders on the left hand, doe but onely turne their bodies like the point of a Compasse, to that hand whereto they wheele, while the bodie comes about with a faster motion and an even front.



Note alſo, that after you haue wheeled to which hand you liſt, and as often as you will, you give in a ſingle companie this word of command, *Halfe files as you were*, that is, as they ſtood in their order both in ranke and file before; but in greater bodies, where the doubling is omitted, you firſt open your rankes, by giving this terme of direction. *Rankes backward to your open order*, and then likewiſe your files by commanding. *Files open* (both waies) *to your open order* of ſixe foote, as this figure both in ranke, and file repreſents.

In opening of *Rankes* and files, you muſt make all the *files*, or *rankes*; ſaving the outer moſt on that hand from whence you meane to open (which muſt ſtand) to moue altogether, till the ſecond *Ranke*, or *File* from that which ſtandeth have gotten its diſtance, and conſequently all the reſt.



Hauing performed the former Motions, you maye afterward exercise your companie of pikes, and Mus-kettiers together, or if you please each a part.

To beginne then whith the Pikes you maye command them to doe these motions standing to wit.

Advance your Pikes
Order your Pikes
Shoulder your Pikes
Charge your Pikes
Order your Pikes
Traile your Pikes
Cheeke your Pikes

But these Motions are to be performed, both standing, and marching, namely,

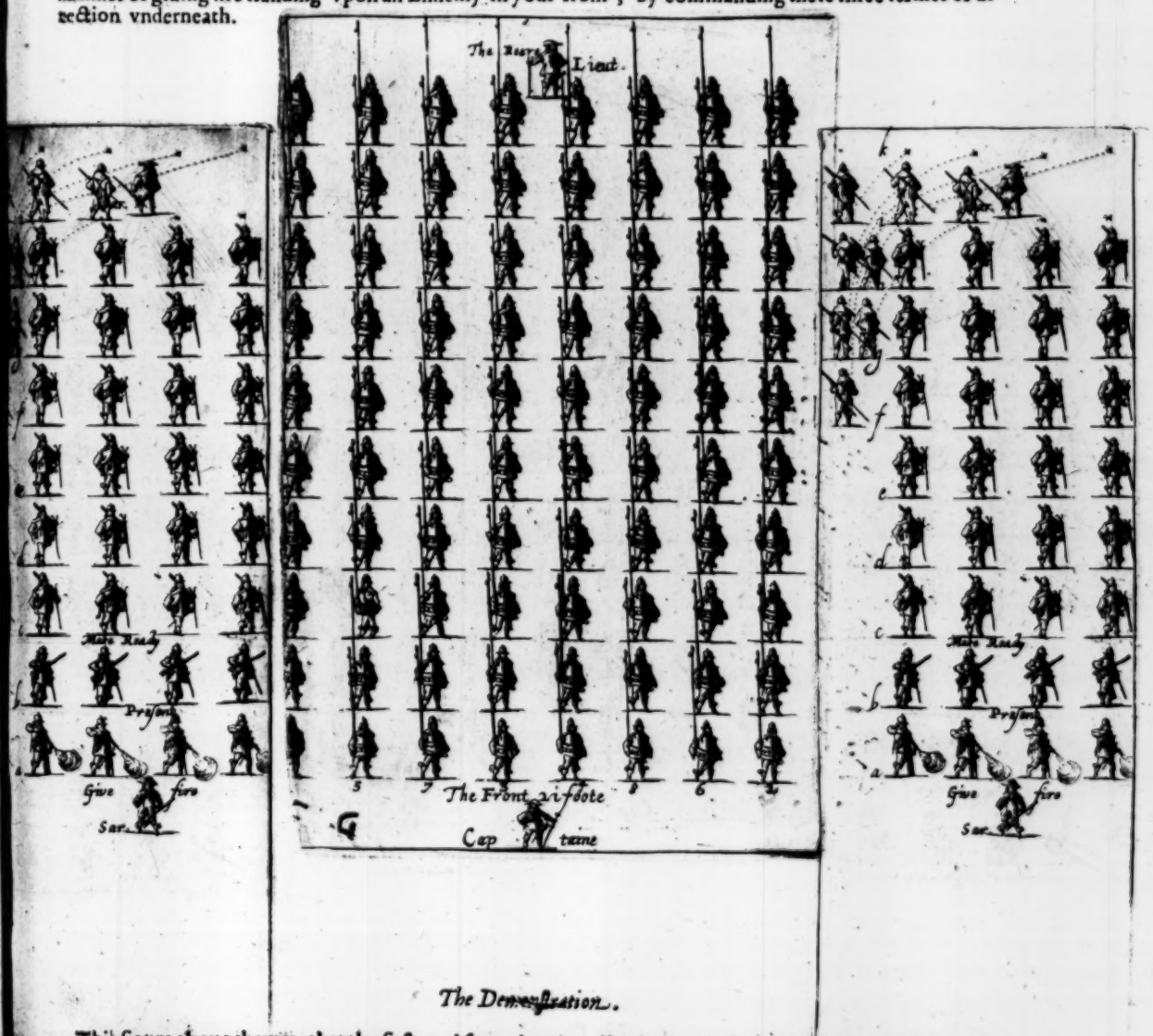
Charge your Pikes.
Shoulder your Pikes.
To the right hand charge.
Shoulder your Pikes.
To the left hand charge.
Shoulder your Pikes.
To the Reare charge.
Shoulder your Pikes.
Stand.
Order your Pikes.

First, note that in charging, halfe the Rankes onely must charge their Pikes, the other hinder most halfe of the Rankes, doe but port their pikes, that is, they carry them so couched, ouer the Heads of the foremost, as maye giue them noe offence, either in charging, or retyring. Besides, this way the pikes are not so subiect, to be broken by the shot of the Ennemy, as when they are advanced.

Secondly, they must likewise obserue, when they charge standing, to fall back with the right legge, and marching to step forwards with the left.

Thirdly, the exercising of your Muskettiers is likewise performed either *Standing* or *Marching*.

That is, either by Rankes, or by Files after three manner of waies, to wit, first hauing an Ennemy in your front. Secondly in your Reare, & thirdly vpon your right, or left hand flanke, as these figures following in exercising of 160 pikes and muskettiers (besides officers will demonstrate) whereof the first showes the manner of giuing fire standing vpon an Ennemy in your front, by commanding these three termes of direction vnderneath.



The Demonstration.

This figure aboue shewes, that the first, and second ranke of both the wings of Muskettiers, hauing giuen fire are fallen away, and are a doing their postures, till they come into the vacant Rankes in the Reare noted, i & k, while the third and fourth Rankes (on both flankes) make ready, and advances vp to the same ground where the first were; euen with the front of the Pikes.

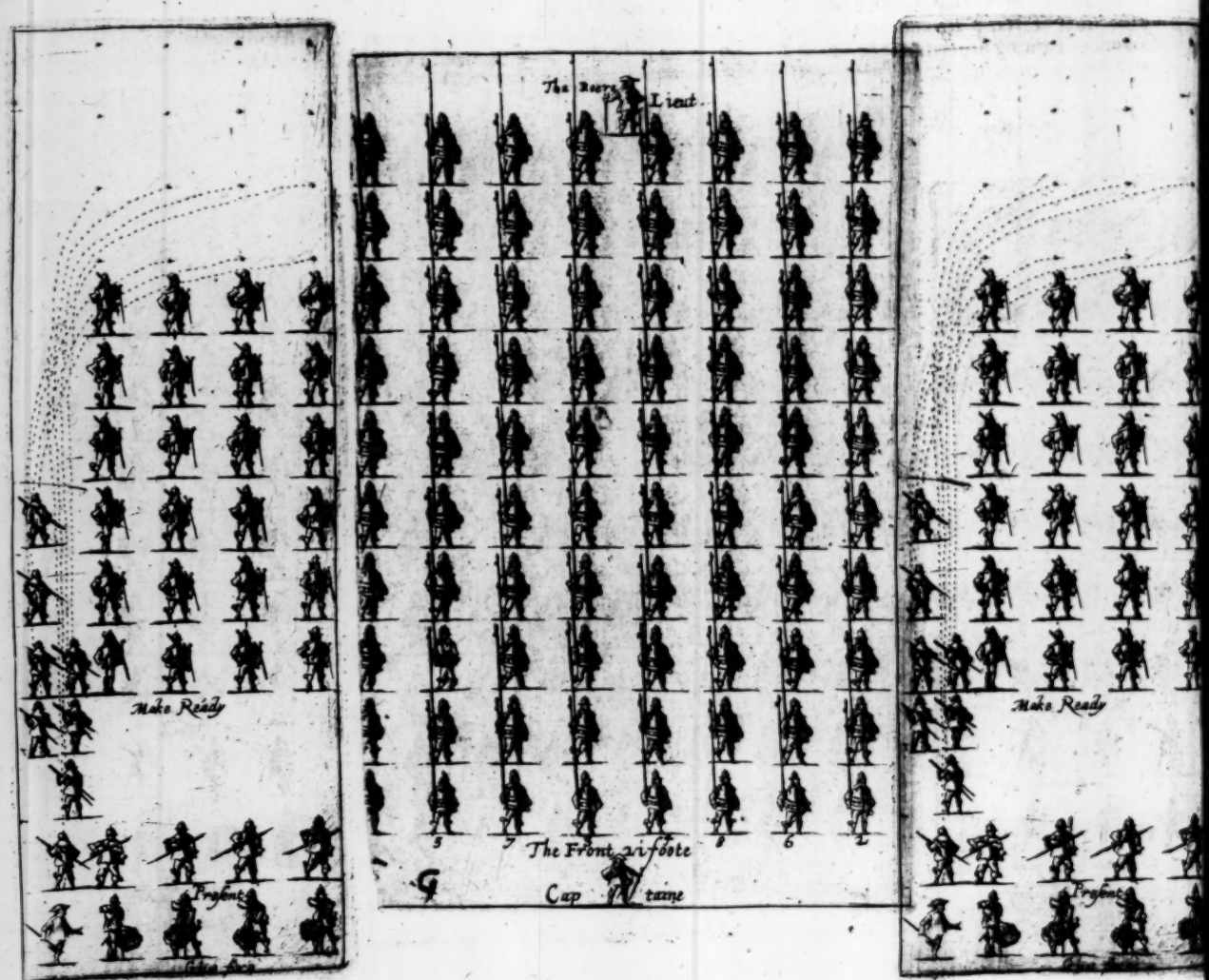
Note also, that the first Ranke falling backe with their right legges, bending their left knee, lies on, & giues fire (as hath bin taught) and the first ranke falling away, the second Ranke in presenting, hauing their pannes garded, blowes their matches, opens their pannes, & stepps forward with their left leggs into the place of the first Ranke, lies on, giues fire, and fall away while the rest of the body of muskettiers moues, vp to their place, and so two rankes at a time, makeing ready, you maye giue fire as often as you list.

You must obserue likewise, that the muskettiers in all these motions, doe turne to the right hand, and are to haue a singular care, to carry the mouths of their musketts aloft, aswell when they are shouldred, as in priming, as also when they keepe their pannes garded, and come vp to giue fire.

Moreouer, if an Ennemie should appeare on either your right, or left flanke, and that you resolue to maintaine your ground, and would gaule him from either flanke: It is performed by giuing first this word of commaund *To the right, or left hand*, which you please, and then makeing an intervall of sixe foote distance betweene the two middle most leaders of the halfe files e & f, for the halfe ranke on the left hand, marked a b c d & e fall doe away betweene the files to the Reere before the pikes, and the halfe ranke on the right hand, k i g h & f. on the right flanke likewise, yow maye giue fire from either, or both flankes, as often as you list.

Againe, if an Ennemy should shew himselfe in your Reere, the like is done by giuing this terme of direction, *To the right hand about*, and having giuen fire vpon them, fall away to the place, where the front stood, euen in the same manner as you did before.

The manner of giuing fire marching, and advancing towards an Ennemy is performed, as this figure following represents.

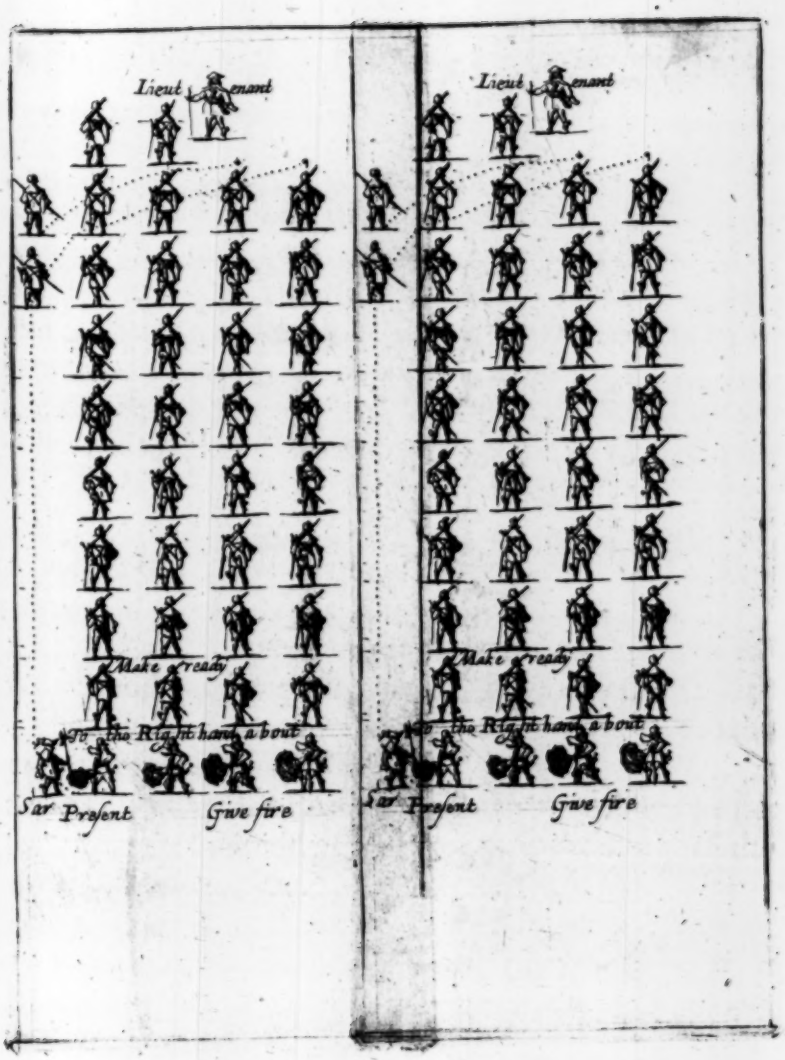


The Demonstration.

In advancing towards an Ennemy, two Rankes must alwaies make ready together, and advance tenne paces forwards, before the bodies, at which distance, a Sariant (or when the bodie is great some other officer) must stand, to whome the musketiers are te come vp before they present, and giue fire. First, the first Ranke, and whileſt the first Ranke giues fire, the second Ranke keepes their musketts close to their Rests, and their panns guarded; and assoone as the first are falne away, the second presently presents giue fire, and fall after them. Now, assoone as the two first Rankes doe moue from their places in the front; the two rankes next it must vnshoulder their muskets, and make ready; so as they maye advance forward tenne paces, as before, assoone as euer the first two Rankes are fallen away, and are to doe in all points, as the former. So all the other Rankes through the whole companie, or division must doe the same by twoes one after an other.

Practi-

A waye howe to giue fire retreating from an Ennemy, which is performed after this ſort, as this figure following showes.

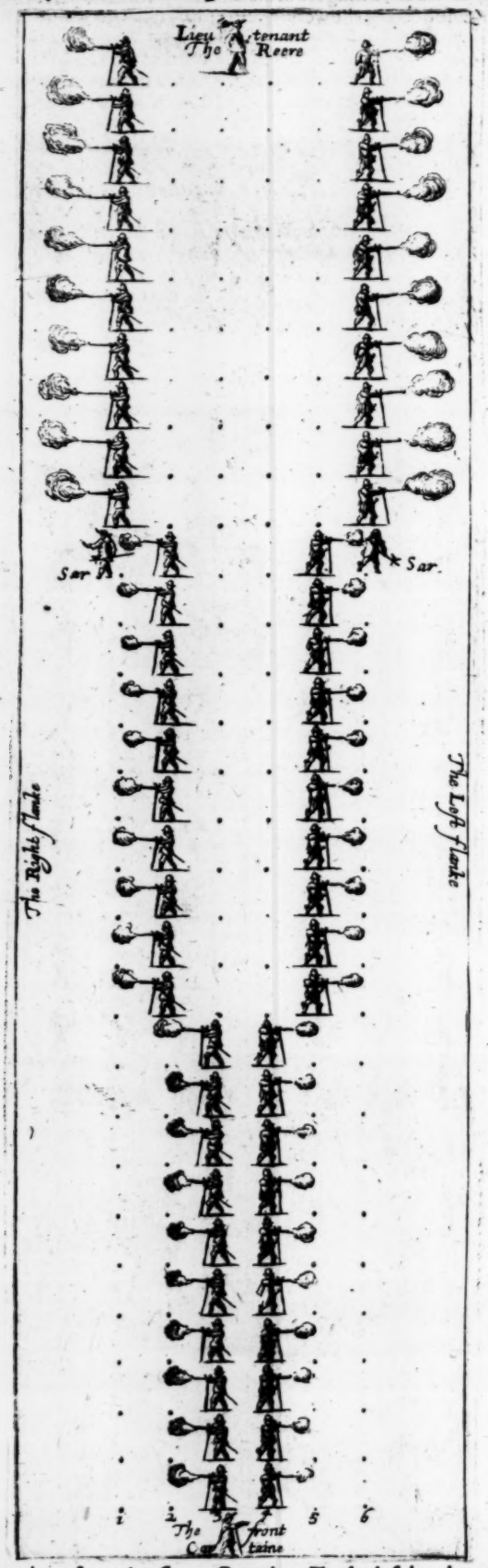


The Demonſtration.

As the troupe marcheth, the hindermoſt Ranke of all, keeping ſtill with the troupe *maketh ready*, and being ready, the ſouldiers in that Ranke turne altogether to the right hand, and giue fire, marching preſently away a good round pace to the Front, and their place themſelues in Ranke together iuſt before the front. Aſſoone as the firſt Ranke turnes to giue fire, the Ranke next it makes ready, and doth as the former, and ſo all the reſt.

Laſt of all the troupe, or whole wing of Muſkettiers makes ready altogether ſtanding, and the firſt Ranke without advancing, giues fire in the place it ſtands in, aud ſpeedely as maye be, yet orderly falles away, all the Ranks doing the ſame ſucceſſiuely, one after an other.

A manner howe to giue fire, either from the right, or left hand flanke, as these 6 files of 60 Musketiers demonstrates.



To the right hand, present, giue fire. Captaine, To the left hand, present, giue fire.

The Demonstration.

The companie, or diuision marching, the outtermost file next the ennemy are commanded to make ready, keeping still a longe with the Bodie, till such time, as they be readie, and then they turne all to the right, or left hand, according to the sight of their ennemy, either vpon their right, or left flanke, and giue fire all together: when they haue discharged they stirre not, but keepe their ground, & charge their peeces againe in the same place they stand. Now assoone as the aforesaid file doth turne, to giue fire, the outmost next it makes ready, alwaies keeping a longe with the troupe, till the bringers vp be past a litle beyond the Leader of that file that gaue fire last, and then the whole file must turne, and giue fire, and doe in all points, as the first did, and so all the rest one after an other. A Sargeant or (if the troupe be great) some better qualified officer, must stand at the head of the first file, and assoone as the second file hath given fire, and hath charged, he is to leade forwards the first file vp to the second file, and so to the rest one after an other, till he hath gathered vp againe the whole winge, & then he is to ioyne them againe in equall front with the pikes.

Practi-

Having shewne the exerciſing of a Compa· ie, through the ſeverall motions therof, it reſteth now that wee come to the ordering of a Regiment marching.

The orders and diſtantes then, which his highneſſe the Prince of Orange will have duely obſerved in a Regiment, both marching and ſtanding are theſe, as the figures following ſhall demonſtrate.

1 His highneſſe exſpreſſely commandeth, that noe files shalbe made leſſe, then tenn deepe, and none otherwiſe: and if there be any ſurplus of the Souldiers in a Companie of a Regiment, they shalbe drawne behinde their Companie, and with the overplus of the Souldiers of every Companie, the Sariant Maiour shall make of them new files, and the ſouldiers of the whole Regiment, that cannot make up a file, and which cannot be above nine in Number, shall march in the Reere of the Regiment before the officer, which shall bring up the Regiment not disbandying them ſelves (or ſtraggling) upon payne of death.

2 When the Regiment marches, the Drummes which shall beate, shalbe placed betweene the third, and the fourth ranke, aſwell of the pikes, as of the Muskettiers.

3 Upon the very firſt motion, when the Drummes beginns to beate a march, the hindermoſt Rankes shall march forward together, aſwell as the firſt Rankes, that the hindermoſt rankes neede not runne, or march any faſter then the foremoſt.

4 The diſtance betwixt the Rankes in marching shalbe ſixe foote one from an other, ſo that the butt end of the Pikes shall almoſt touch the heeles of thoſe that march before them.

5 The Files shalbe noe more then three foote diſtance one from an other.

6 When a Regiment marches in diviſions, then the halfe of the Muskettiers shall march before the Pikes, & the pikes in the midſt, and the other halfe of the Muskettiers in the Reere of the Pikes.

7 Obſerving well, that they muſt then march tenn in front at the leaſt, if the waye be fit thereunto, keeping allwaies their diſtance both in ranke & file as aboveſaid.

8 The officer that shall leade any part of the Regiment, shall take vp noe more place, then the diſtance of a Ranke, which is ſixe foote, to the end they maye follow one an other the better, & ſo neither looſe time, nor place in marching.

9 And for the officer which shall March after any part, or diuision of the Regiment, hee shall follow the last Ranke of those, which march before him, obserue likewise the distance of sixe foote, to the end that betweene him, and the officer, which shall leade any part or diuision of the Regiment following, there maye be likewise sixe foote, and so betweene the first, and second diuision there must be 18 foote distance.

10 If the Regiment be diuided, and lead in two troupes, the second diuision of the Regiment, shall follow the first about the distance of tenn, or twelue paces, and noe larger, as this first figure of 12 English Companies marching in Brabant Anno 1635 shall illustrate his highnesse pleasure therein.

11 The distances betweene the Regiments, which march one after an other, shalbe 18 or 20 paces, to wit, sixe foote for the officer, that marches in the Reere of the Regiment, and sixe foote for the officer, that leads in the front of the next Regiment, and the rest of the place betweene both the officers aforesaid.

12 Betweene the Brigades, or Tercias of the Armie, they shall obserue their distances according to discretion, to wit about 20 or 15 paces; takeing heede that they march not too wide one from an other, least they both loose time, and place in marching.

13 And where there is roome enough, the Regiment shall march closse, and in one bodie, obserue euermore the distance of Rankes, & files as aboue said.

14 Betweene euery fiue files at the most, and betweene euery three files at the least of the Muskettiers, they shall leaue a space of sixe foote broade, keeping (as much as possible maye be) the Muskettiers of one companie together.

15 When the Regiment stands in Battaile, and that the Regiment consists of two Diuisions, each diuision shalbe 50 foote distant one from an other.

16 And if the Muskettiers of a Regiment be more in number, then the pikes, and consequently falls out broader then the front or, diuision of the pikes, then they shall closse inward, towards both the troupes of the pikes which stand before them thus, *and as this second figure following shewes.*

17 But if so be the number of the muskettiers be too great, and that by reason of the intervals, or the spaces of 6 foote, that are to be made betwixt them for their number, having noe place to fall, or closse inward, without touching one an other, then the two troupes of muskettiers on both sides of the Pikes, after whome they stand shall fall outwards, as this third figure following represents.

Note

Note that, though the Coullours are placed in marchingor ſtanding, betweene the fifth and the ſixth rankes, for the more Safegard of them; yet by giving this word of comannd, *Collours advance vp into the front*, the Enſignes may vaile them, when the Prince, or the Generall comes by, or elſe for their eaſe Pick them downe before the heads of their companes.

18 All woemen, lackies, ſervants, Bread, and Brand wyne men, belonging to the Regiment, ſhall march after their owne Regiment, and not before, up on the ſlancks thereof. For the better obſervation whereof, The Provoſt Marſhall of every Regiment, ſhall take ſpeciall care, which if he doe not he ſhalbe dimiſſed from his place without any connivencie.

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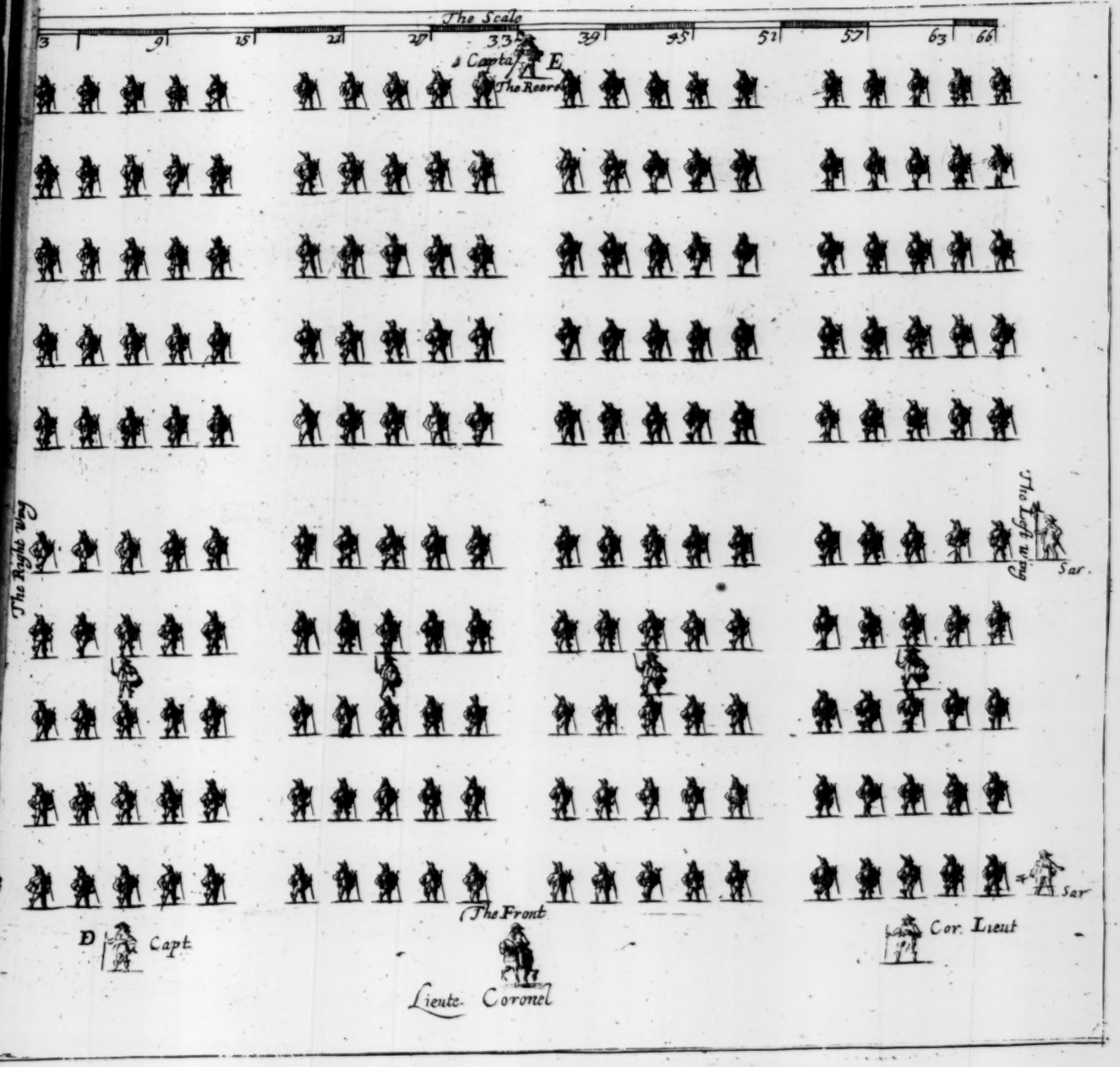
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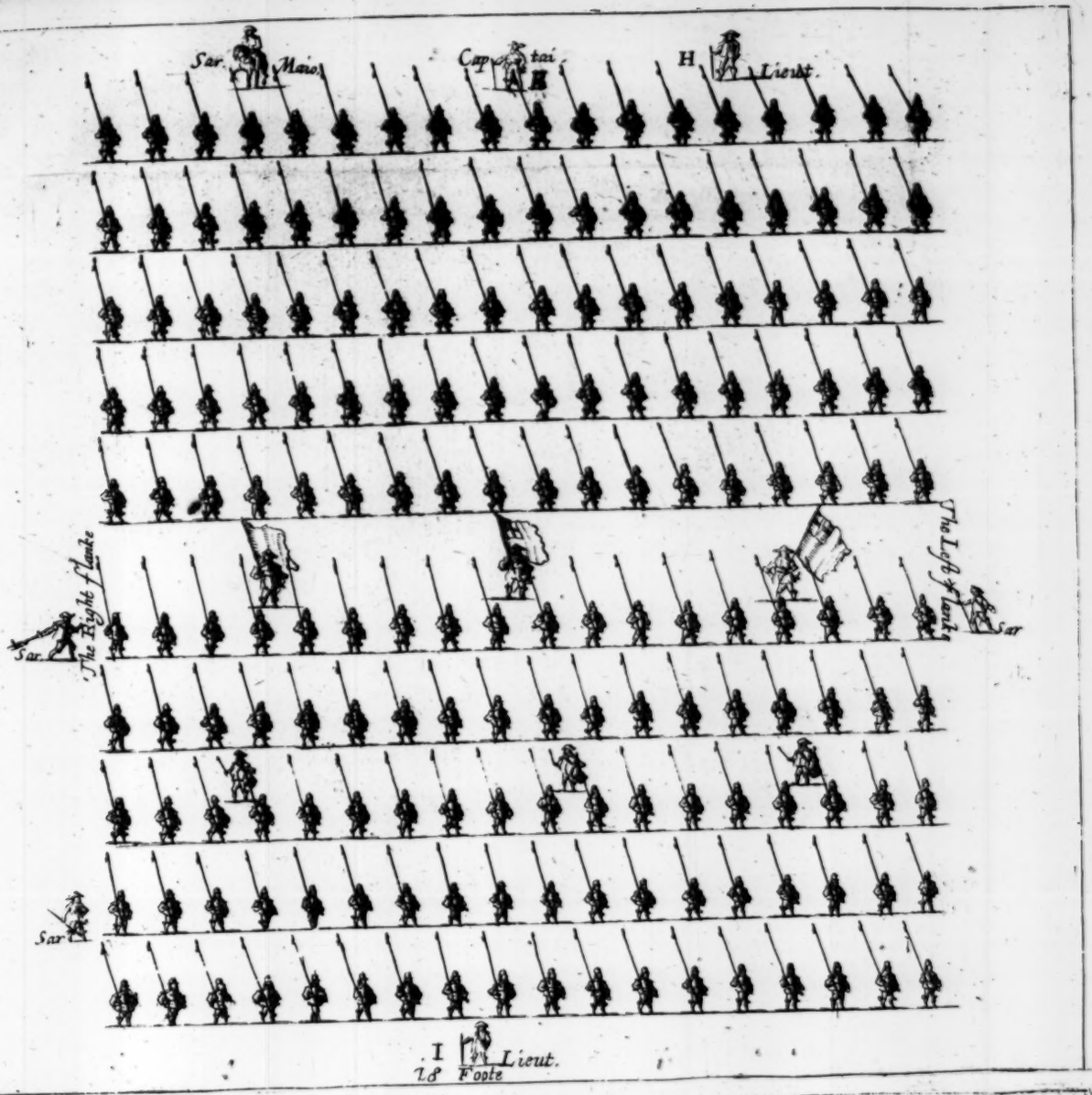
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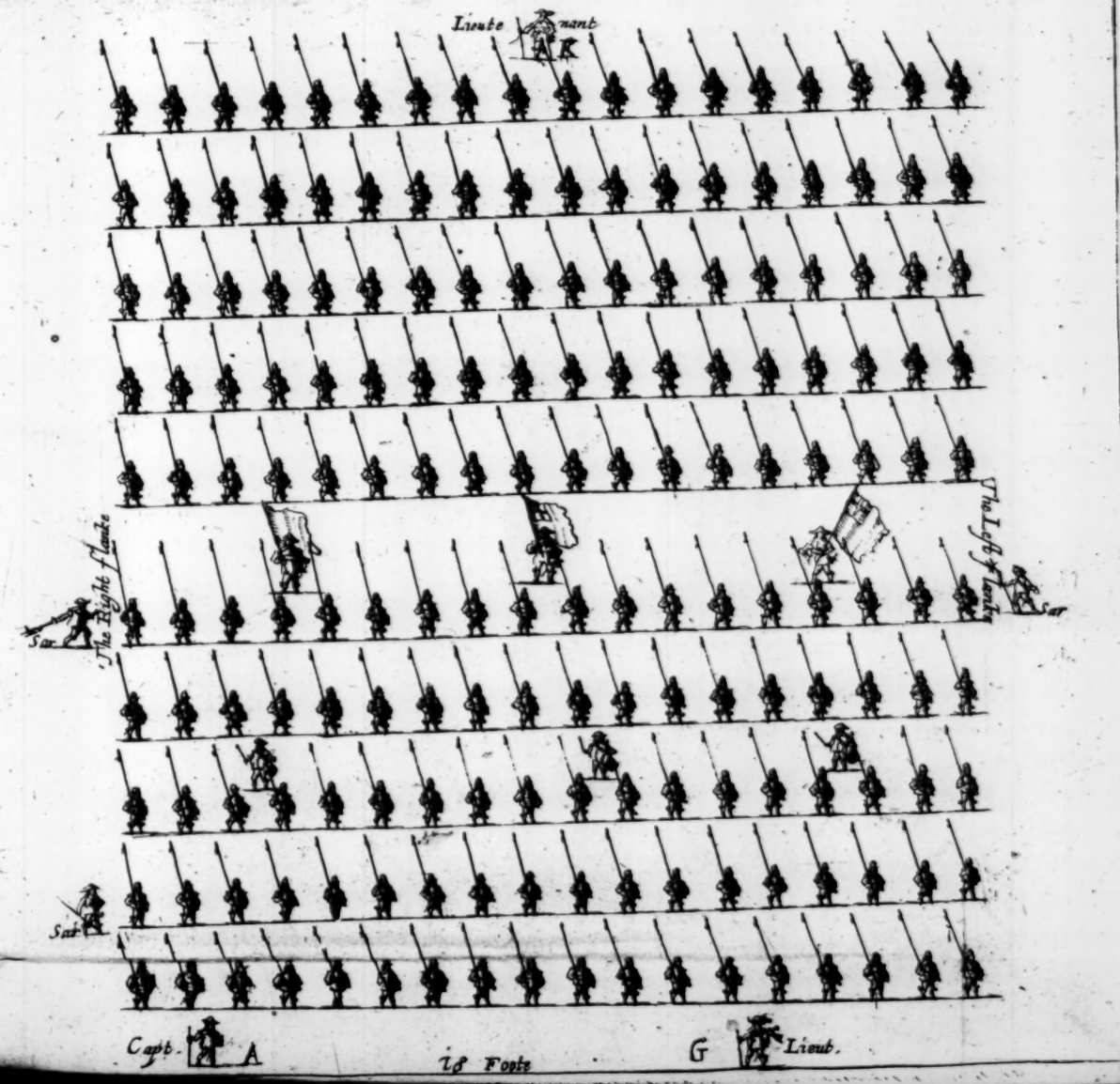
18 Foote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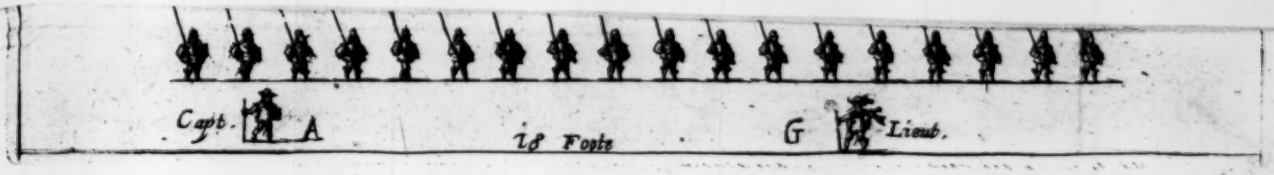
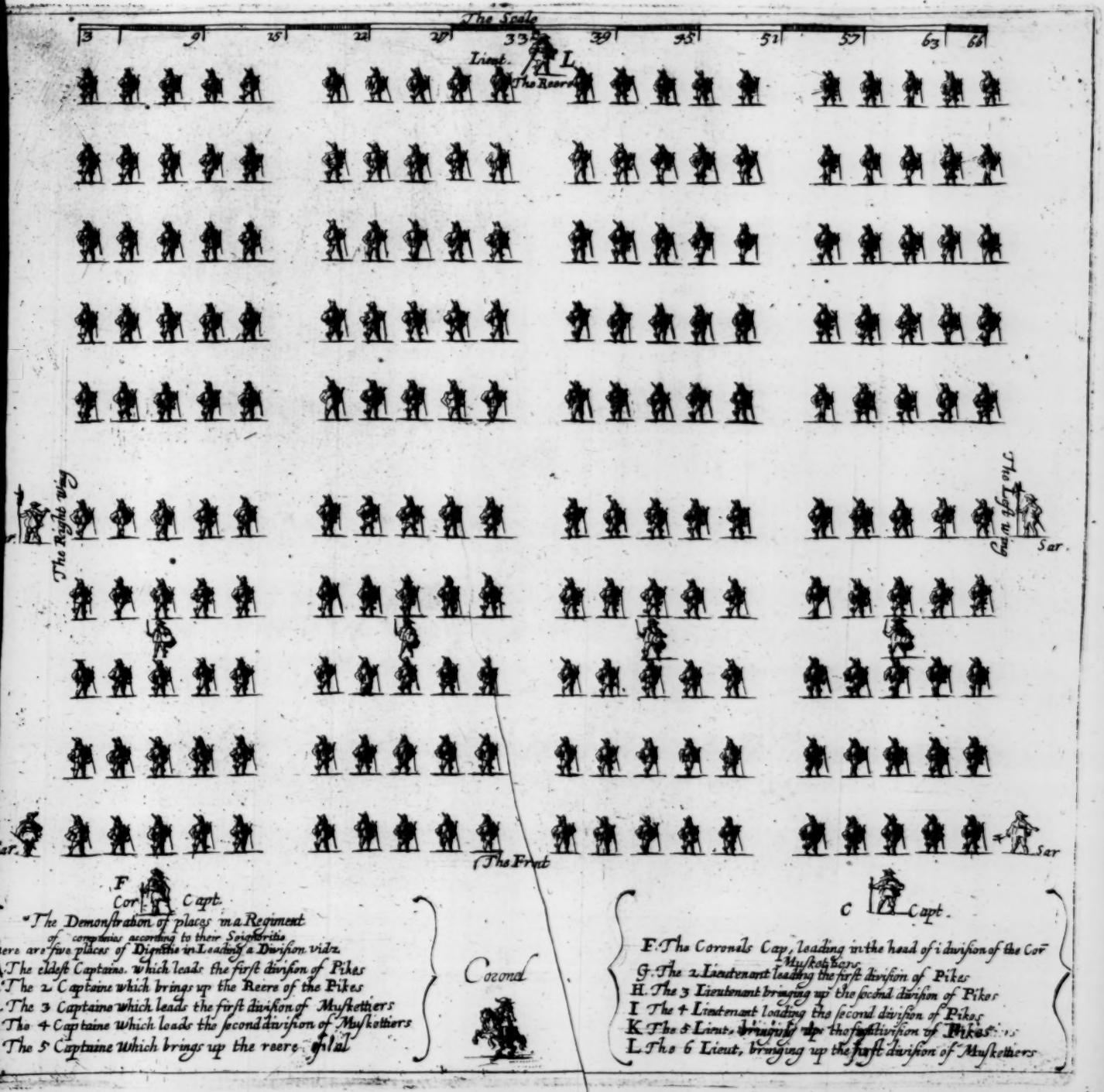




The Demonstration of places in a Regiment of companies according to their Seigneuritie

There are five places of Dignitie in Leading a Division vidz.

A. The eldest Captaine. which leads the first division of Pikes
B. The 2 Captaine which brings up the Reere of the Pikes
C. The 3 Captaine which leads the first division of Musketiers
D. The 4 Captaine which leads the second division of Musketiers
E. The 5 Captaine which brings up the reere of all

F. The Coronels Cap, leading in the head of 1 division of the Cor Musketiers
G. The 2 Lieutenant leading the first division of Pikes
H. The 3 Lieutenant bringing up the second division of Pikes
I. The 4 Lieutenant leading the second division of Pikes
K. The 5 Lieut. bringing up the first division of Pikes
L. The 6 Lieut, bringing up the first division of Musketiers

The Scale
3 9 15 21 27 33 39 45 51 57 63 66

Captain E
The Reare

Sar. The Right wing

The Left wing Sar.

Sar.

D Capt.

The Front

Cor. Lieut

Sar. Maior

Captain A B

H Lieut.

The Right flanke

The Left flanke

Sar.

Sar.

Sar

I 18 Foote Lieut.

The Scale

3 9 15 22 27 33 39 45 51 57 63 66

Capta E

The Reere

The Right wing

Ser.

The Left wing

Ser.

Ser.

Ser.

D Capt

The Front

Cor. Lieut

Ser. Maior

Capitai

H Lieut.

The Right flanke

Ser.

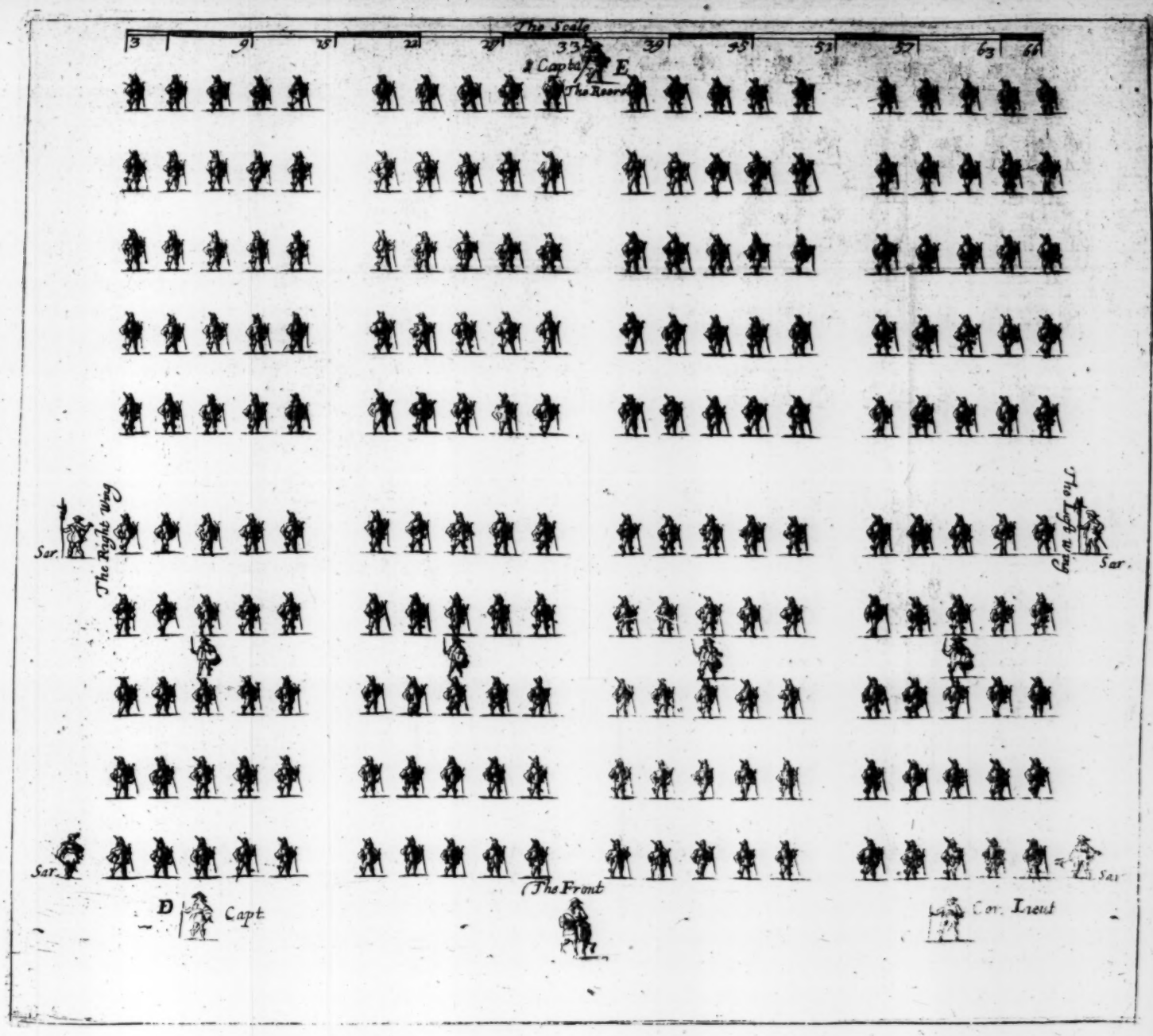
The Left flanke

Ser.

Ser.

I Lieut.

18 Foote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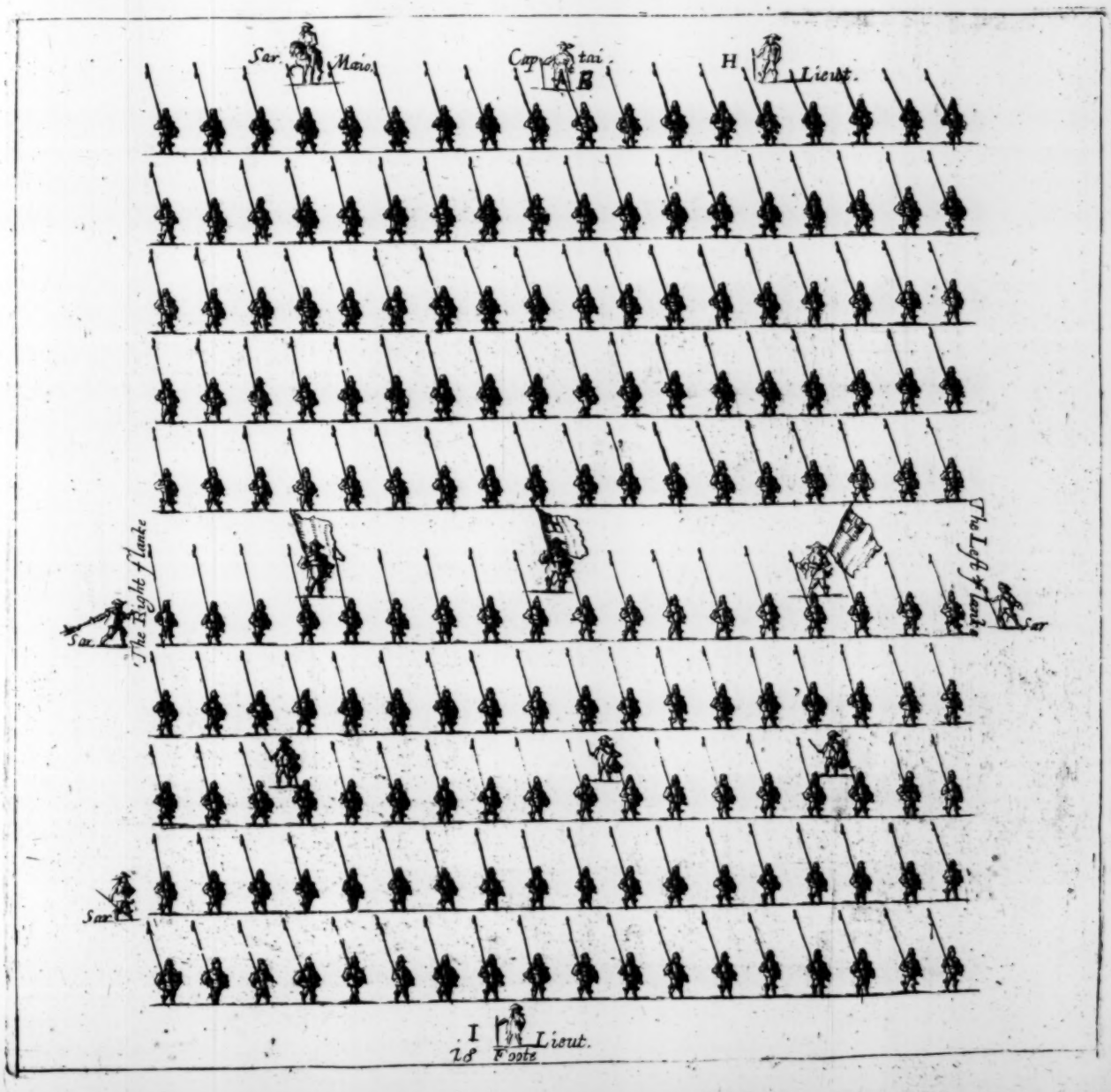
The Front
Cor. Lieut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The Left flanke
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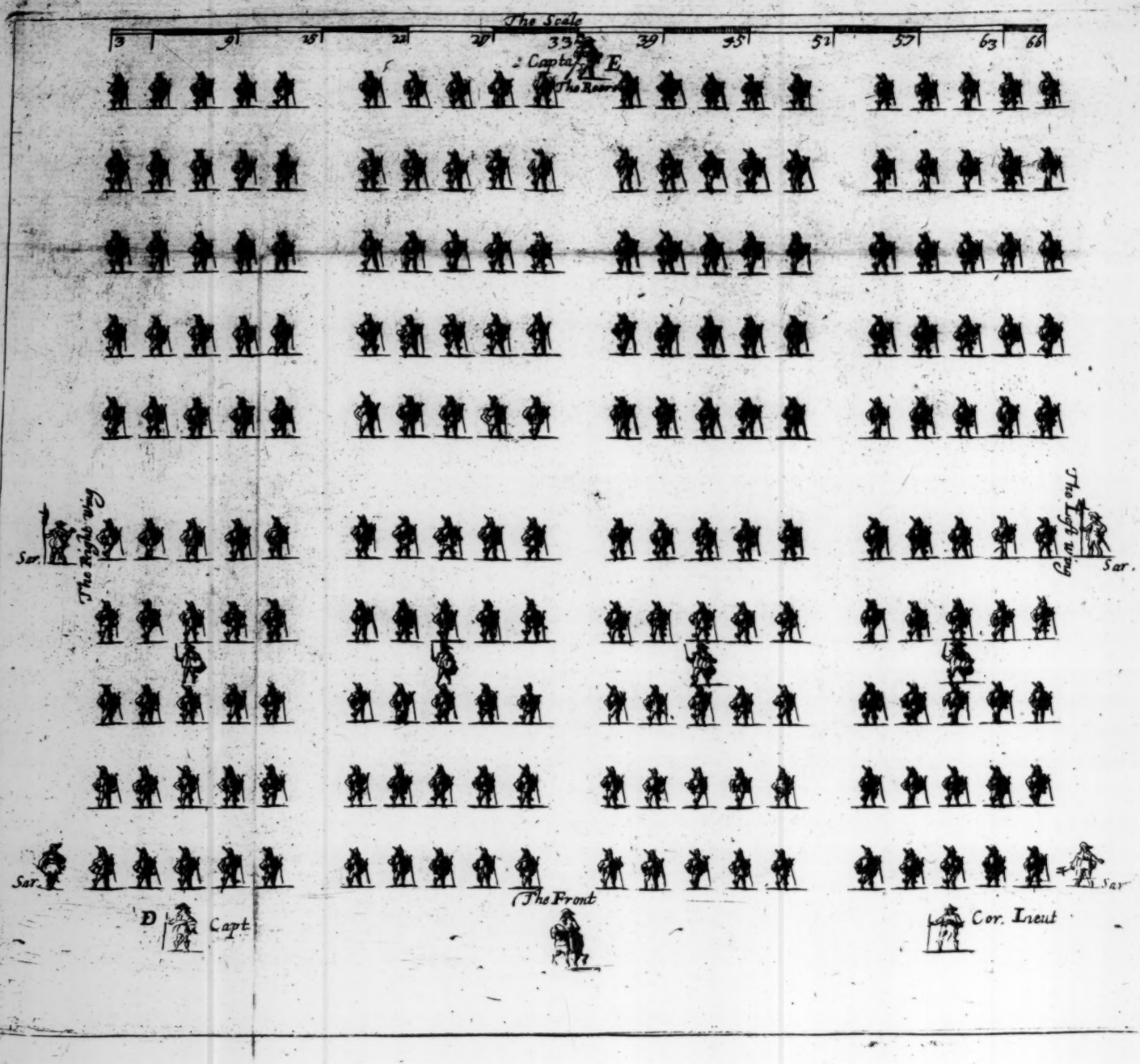
Lieut.
18 Foote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The Right wing
The Left wing
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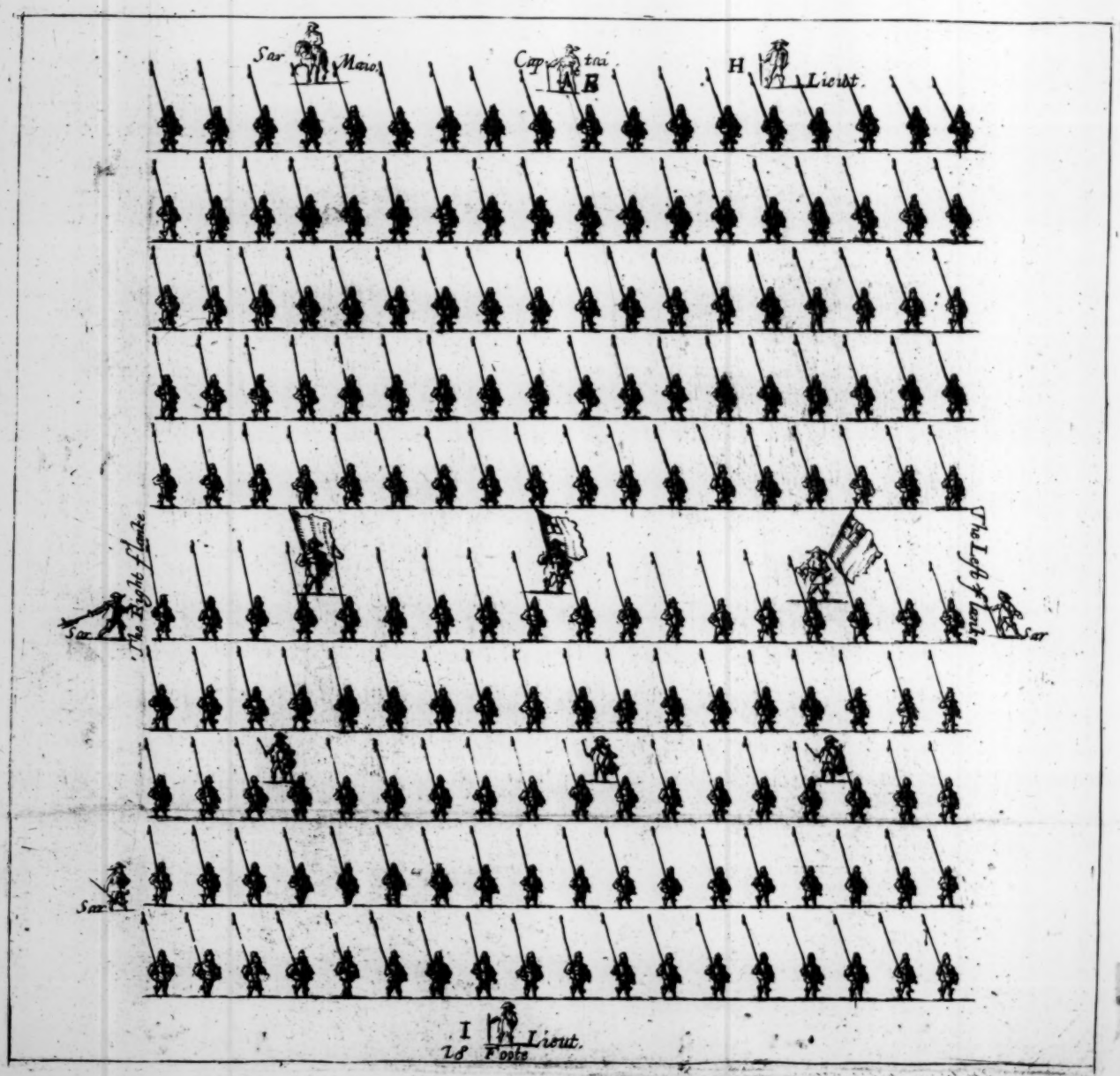
The Front
Cor. Lieut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The Right flanke
The Left flanke
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Lieut.
18 Foote

AN

APPENDIX,

Of the Quarter for the ranſoming of Officers of all Qualities, and Souldiers, concluded betweene the King of of Spayne his ſide, and the ſide of the States Generall, of the vnited Netherlands.

Together, with the lawes, and articles of Marſhall Diſcipline enacted on the States ſide.

VVith their placcard of Muſters.

AND

Other neceſſaries depending on the warre.

Printed ad DELFE,

By Ian Peterſen VVaelpote Boeck-printer, in de Printerie, ANNO 1637.

A Copie,

Of the Articles of Quarter, for the Ranſomes of Officers, and Souldiers agreed, and concluded on betweene the King of Spaines ſide, and the States of the vnited Provinces, Tranſlated out of Dutch into Engliſh.

Don Franciſco de Mendoza, Duke of Veraguas, Admirall of the Kingdomes, and Crowne of Arragon, & of the VVeſt-Indie, & of the Ocean ſea, Marqueſſe of Guadeleſta, and of Iamayca, Conte de Montalegre, and of Adelantado in the Indie, Lord ſo Valey, of Setta Trandel, & Contrides, and of the Barronies of Gorga Bechi, Ribaroſa, Andara, & Venidolech, Commander of Valdepenas, of the order of Calatrave, Stuard, vnto his Catholicke Maieſte, and one of his Councel of State, and of the warre, High ſtuard to the illuſtrious Albert Archduke of Auſtria, Captanie Generall of the light horſe in the Netherlands.

BEing found fitting for certaine good reſpects, to make a more perticular, and a more ſpeciall declaration, then hath bene heretofore of the Quarter, which ought to be held, and obſerved betweene the melitie, and Souldiers of his Matie, and the Illuſtrious Archduke on the one ſide, and thoſe of Holland and their aſſociates on the other ſide: becauſe there happens dayly diſputes, touching the ranſoming of ſome perticular men, and the exceſſive charges, which they are att about their dyet, and other things, & which is exhauſted from the priſonners, who in regard of theſe exceſſive expens, are not ſometimes able to pay, & ſatisfie them, and therefore are forced to ſtay longer in priſon, then they ſhould doe to their great hurt, and the dammage of thoſe which have taken them priſonners. To the intent then; that euery man maye preciſely know, for what ranſome he maye be releaſed out of priſon, and that noe more exceſſiue charges maye be preſſed out of him, being not able to paye it: *It is ſo*, that wee have ſpecified by writting the taxation; which euerie man is bound to paye, and which noe man ſhall violate, or infringe in this forme and manner following vidz.

	gilders	*A reformado.*
A Captaine of a troupe of horſſe *in Eſſe.*	1000.	300. gs.
A Lieutenant of a troupe of Horſſe in Eſſe	200.	75.
A Cornet in Eſſe	150.	50.
A Lieutenant Coronell of foote in Eſſe	700.	200.
A Sariant Maiour of a Regiment of foote, being, or having bene a Captaine	700.	gs.
And being noe Captaine	150.	50
A Captaine of Foote in Eſſe	600	50
A Lieutenant to a Sariant Maiour a foote	75	
A Sariant Maiour of a particular place	100	
A Lieutenant of foote	60	
An Alpherus, or an Enſigne	60	

All Sariants, clarkes of Companies, and other inferiour Officers ſhalbe releaſed for their months paye.

Likewiſe all Souldiers ſerving, aſwel on horſe, as on foote ſhalbe releaſed for a months pay, as hath bin accuſtomed in former times.

A Quartermaſter Generall for 400. gs.

The perticular Quartermaſters, aſwel of Horſe, as of foote Regiments, a Captaine of the watch, a Captaine of the Guides, and all thoſe, which ſerve vnder the Quartermaſter Generall, with the Officers above ſpecified, all of them, ſhalbe releaſed for a months pay.

A Commiſſarie of the Muſters 300 gs.
The Officers and Commiſſes of the *Veador*, *Contador*, *Pagador*, belonging, to the Treaſurie of VVarre each of them shalbe ranſomed for 200

For thoſe of the Train belonging to the ordinance.

gs.
The Lieutenant of the ordinance 600
A Gentlemen of the ordinance and maſter Cannonier 60
The *Contadors*, *Commiſſ:s*, *Controullers* and *Pagadors* of the ordinance, or amunition each 300
The *Receivers* of the ordinance each 300
The *VVaggenmaſter Generall* 600
His Lieutenant, and other Commiſſes of the waggons each 60 gs.
The chiefe Commiſſarie of the Canon horſſes 300 gs.
All other Commiſſes, or particular Commiſes of the Canon horſes each 60 gs
The Conductors of the Ordinance, Amunition, VVaggons, and Canon horſes, each in his traine 15 gs.
Each Canounier 15 gs.
The Maſters of the fire-worckes each 70
Each of their Conductours 20
The Captaines of the pyonniers each 100
Each Pyonnier 10
The ſaylours, which ſerve about the ordinance: aſwell in the one, as in the other army, or other perticular workmen, shalbe releaſed each for 15. gs. and the Captaine of theſe ſaylours each for 300 gs.
The Bridg-maſters or Captaines of the punts 100
Their Lieutenants, each 30 gs. a peece, and thoſe which have the overſight of the bridge or punts 12 gs.
The Inginiers and Controulers of the workes, each 150 gs.
The Commiſſes, Conductours, the officers, and takers on of workes each 30 gs.
The Captaine of the miners 60 gs.
And each miner 15
The Captaine of the Carpenters 60
And euery carpenter vnder him each 20
The Maſter Farrier 60
And euery ſmith, or workeman vnder him 12 gs.
The VVaggon-men, or thoſe that repaires the broken waggons of the traine of the ordinance, victuals, or any of the army, and the drivers of canon horſes each 10 gs.
The Auditour, the Quartermaſter, the Phyſician, the Apothecary, the Chirurgian, the Provoſt of the Ordinance, each is to be ranſomed for two months entertaynment, and all and euery one that is vnder them each for a months pay.

The Traine of Victualls.

The chiefe Commis, or the Receiuer of the victuals 600 gs.
Each Commiſſe ſerving vnder him 200
The Commiſſes, Staplers, or *Tenidores* of the *Baſtimientos* each 300
The Controulers, or Commiſſes of the Victuals 300
The Commiſſes of the waggons, of the victuals each 60
And thoſe which ſerue vnder them, and the Conductours each 15
All officer belonging to the Geſthouſe shal be releaſed for a months pay.

And if there should happen any diſpute, touching the quality, or pay of any here above mentioned; he shalbe condemned by the declaration, which he shall give over in writting vpon his honour, which shalbe credited by him that Gouvernes, Commaunds the Armie, Province, or Towne on the priſoners ſide, without producing any further teſtimonie.

None shall detaine any priſonners againſt this Quarter vpon any colour, or pretext whatſoeuer, aſwell on the one ſide, as on an the other; but aſſoone as the money of any priſoner is proffered

proffered to pay his ranſome, according to the taxation aboue ſpecified, and his dyet money for meate and drincke, paying alſo the Prouoſt his fees, according to the liſt made, and agreed vpon, bearing the date hereof, together with the declaration of his qualitie, they ſhall ſett him at libertie with in 48. howers after it, without any conſideration of his fellow ſouldiers, whichwere taken priſonners with him, or whether others pay their ranſomes or noe, vpon penaltie, that thoſe that keepes them any longer, ſhalbe bound to pay all the charges, which afterward they ſhalbe att for the time of their detaynment, and if any comes to queſtion their releaſement; they muſt doe it vpon their owne charges, and if they ſhould be ouerthrowne in their ſuite, the proceſſe aſwell on the one ſide; as on the other ſhalbe determined with in 14. daies, after the firſt inſinuation is made vpon the penalty aboueſaid.

Neither ſhall they detaine, either on the one ſide, or on the other any Trumpetter, or Drummer coming for the priſoners, vnder any coulour what ſoeuer of thoſe that detaines them.

And to the end there maye bee a certaine rule for their Dyet, and the Prouoſt marſhalls fees: the liſt here vpon agreed, and concluded on, bearing the date hereof, ſhall be ſtrickt ly kept & obſerved, aſwell in garniſon as in the armie, and (as is ſaid) ſhalbe coppied out both in French, and in Dutch, which ſhalbe ſent by the *chiefs* vnto euery garniſon, with expreſſe commaund to follow it, and not to tranſgreſſe any part thereof, vnder what pretence ſoever vpon the penalty therin contayned. The *chiefiaines* on both ſides, promiſſing to give ſatisfaction for that which ſhalbe broken on their ſide to the contrarie.

And to take away all occaſions of difficultie againſt the ſaid liſt. It ſhalbe commaunded euery where, and to all perſons, which are priſonners both on the one ſide, and the other (without any diſtinction, whither they be included in the quarter or noe) they ſhalbe brought vnto the Marſhall Generall of the Armie, or of the garniſon, without keeping them in Inns, or other places vpon penalty, that they ſhall not be forced to pay any more for their dyet then according as they are taxed in the liſt aboueſaid, and the contents thereof.

All Captaynes of horſe, or foote, which haue the charge and office, of a *Droſſard*, or otherwiſe, being not in the poſſeſſion of their *Droſſardſhip*, or office ſhalbe releaſed for a Captaines ranſome ſpecified above, and being in poſſeſſion of the one, or of the other, they ſhall not be included in this Treaty, but ſhall pay each a ranſome as ſhalbe agreed on by them.

All thoſe alſo, which are not comprehended in the memorandum aboueſaid, ſhall pay ſuch a ſumme of money, as ſhalbe likewiſe agreed vpon.

All Ranſomes, and dyet money ſhalbe payd with ſuch currant coine, and vpon the ſame valuation, as it goes in the place, where the priſoners are kept.

And ſeing it often happens, that ſome Horſe captaines & others are employed vpon enterpriſes, and Commaund as *chiefes*, ouer a troupe of three or foure hundred men: ſerving either on Horsback, or a foote, without having any commiſſion, or entertainement aboue their ordinary pay: wee intend that ſuch Captaines ſhal giue noe higher ranſomes, then other Horſe, or foote Captaines, and if they haue any other Commiſſion, or entertaynment aboue their ordinary pay, they ſhall not be comprehended in this aggreement, but ſhall pay ſuch ranſomes as ſhalbe agreed vpon.

All Captaines, Officers and Souldiers mentionned hereaboue, which were taken priſonners before the date of this preſent Treatie, and are included in the former Quarter of the xjth of Iune in the yeare 1601. ſhalbe ſett al liberty by vertue of this quarter, in what place ſoeuer they are priſonners, aſſoone as they haue payd their ranſoms & dyet, according to the taxation of the ſame quarter, and liſt made then: and ſhall in noe wiſe be detayned after the preſentation of their monies: vpon penalty of paying the charges, which ſhould arriſe hereupon afterward.

And thoſe which are taken priſonners during this preſent Treaty ſhall enioy the benefit hereof, moreouer this quarter generall ſhalbe obſerved & kept ſtrictly, and punctually on both ſides, ſo that noe man maye oppugne, or infring it in any manner ſoeuer, vpon payne of paying the aboueſaid expēſes: reſerving never the leſſe, that the chiefes on both ſides, which haue power to make a generall quarter maye breake, or alter the ſame, when as the one, or the other ſide ſhall finde iuſt cauſes, and reaſons to doe it: vpon condition, that he ſhall giue

warning thereof twentie dayes before he breakes it, by an expreſſe Trumpetter, or drummer with an act vnder his owne hand: for otherwiſe this quarter shall in noe wiſe whatſoeuer be infringed or broken. And thoſe which shalbe taken priſonners within the terme of theſe xx. daies, shalbe ranſomed according to the abouesaid taxation, without any other charge, or detaynement: but thoſe which shalbe taken priſonners after the expiration of theſe 20 daies, shalbe bound to pay ſuch a ranſome, as shalbe agreed vpon with them, intending that in this treaty all Captaines, officers, and ſouldiers, shalbe included, and all others above mentioned without any exception, whither they be in the army, or out of it in any garniſon. And to this ende we haue made two acts of this Treaty, of one and the ſame tenure, and ſubſtance in the name of chiefes of the one and of the other Army, who haue full power, and authority to make this quarter. Giuen in the Hagh the 14th of May 1602. and was ſigned.

F. M. Admirant of Arragon.

And is ſealed with his ſeale of Armes in redd waxe and vnderneath is written

By order from his Excie.

And is alſo ſigned

G. de Roy.

Tranſlated out of French into Dutch and is found to agree with the principall 1602.

JAN VAN DALEN Griffier, or Secretary to the Councill of warre of the vnited Netherlands.

A LIST

Of the daylie diet, according to which euery Provoſt Marshall, and the Keepers of Priſonners on both ſides shall allow their priſonners, without any pretext of exceeding the ſame, ſo that if they doe ſatisfaction shalbe made by their perſons, and vpon their intertaynments.

All theſe priſonners following shall haue noe more allowance for their meate and drincke vpon what pretence ſoeuer but 10 ſtiuers a day vidz.

All private Souldiers ſerving a foote.
Conductours of the Ordinance, Amunition, of the victuals, of workes and fire workes.
Cannoniers.
Pionniers.
Saylours about the ordinance.
Brigd-men.
Sobreſtants, Commiſſes, Officers, Chaſſanantes & worke Baſſes.
Miners.
Carpentiers.
VVaggon-men and drivers of Canon Horſes none of theſe are to haue aboue 10. ſts. per diem.

Al theſe perſons following shall ſpend noe more in meate, or drincke, then fifteene ſtiuers a day. vidz.

All Horſemen.
Sariants.
Gentlemen of the ordnance & maſter Gunners.
The Lieutenant, or particular Commis of the VVaggons.
The Comiſes, or particular Commiſſaries of Canon Horſes.
The Lieutenant of the bridge.
The officers belonging to the Geſthouſe of the Armie.

All,

All theſe perſons following contayned in the Quarter, shall ſpend noe more in meate and drincke but a gilder a day, vidz.

A Reformed Horſe Captaine.
A Lieutenant, or a Cornet of horſe, whither reformed ar not.
A Reformed Captaine of foote.
An Aſſiſtant to the Sariant Maiour.
A Sariant Maiour of a particular place.
A Lieutenant, or an Enſigne reformed or not.
A particular Quartermaſter.
A Captaine of the watch.
A Captaine of the Guides.
A Commiſſarie of the Muſters.
The Officers, or Commiſſes, of the *Veador*, *Contador*, *Pagador*, or Treaſurer of warre.
The *Contador*, Commiſſe. Controuler, and *Pagador* of the ordinance.
The V Vagin-maſter Generall.
The chiefe Commiſſe of the Canon horſes.
The Maſters of Fortifiations & workes.
The Captaine of the Saylours for the ordinance.
The Captaine of the Pionniers.
The Bridge-maſter.
The Inginiers & Controulers of workes.
The Captaine of the miners.
The Captaine of the Carpentiers.
The Maſter ſmith.
The Phyſician, Quartermaſter, Auditor, Apothecary, and Chirurgian of the ordinance.
The perticular Commiſſes of other victuals.
The ſtapelers and Tenedores de Baſtimentos.
The coutrouler, or Commiſe of the victuals.

The perſons following and all others of a greater quality maye vſe themſelves, as they pleaſe, and ſpend euery day aſmuch as they liſt.

A Horſe Captaine.
A Lieutenant Coronell.
A Sariant Maiour of a Regiment.
A Lieutenant of the Ordinance.
A Foote Captaine.
A Quartermaſter Generall.

The chiefe Commiſſe, or Giuer out of the Victuals, what it pleaſeth them.

Touching the yron money, a Captaine of foote, or a Captaine of Horſe, and all other of a higher quality, shall giue noe more to the Provoſt for his fee then two gilders.

And all other perſons of an inferiour qualitie, included with in this quarter: shall giue noe more for their yrons then twentie ſtiuers.

All other perſons, which are not included in this quarter, as Burgers, Peſants, Inhabitants of Townes, Marchants, Sutlars, and all other perſons not ſpecified hereaboue, shal ſpend noe more for their dyet in meate, and drincke, nor be charged with any more, then 15 ſts. a day, yea not vpon their owne deſire, vnleſſe they had agreed for their ranſomes before, and had putt in ſufficient caution for the payement thereof: vpon penaltie, that the Provoſt, Marshall and others, which shall haue alloued their priſoners more then is ſett downe in this liſt, shall looſe the ſame, aſwel of theſe priſoniers, as of al others aboue taxed, which priſoners they shall not detayne for the expenſes ouer and aboue, nor hinder their goings out, aſſoone as euer they are payd, according to the former taxation, vpon penalty, that they shall haue noe other expences allowed them.

Of the perſons abouesaid not included in this quarter, they shall take noe more for their yrons then 30 ſtiuers.

All Provoſt Marshalls, and Kepers of priſons of warre, shalbe bound henſe forward to vſe their priſonners well for their meate and drincke, according to the rates aboue mentioned

and that vpon their honours, and as they shall answere it before God and man, so that noe Complaints come of it. Giuen by his Excie, in the Hagh the 14th of May 1602. And was signed

F. M. Admirant of Arragon.

And vnderneath was written'

By order from his Excie.

Subscribed *G. de Roy.*

Having in the margent thereof his seale of armes in red waxe.

And aggreeth with the principall, witnesse mee

Ian van Dalen.

The Coppie of the quarter amplified by Marquesse Spinola. Translated out of Dutch.

TO take away all difficulties, that might arise vpon certaine points, about keeping of the quarter made heretofore by the Admirant of Arragon Anno 1602. and to treate of some others, where of noe mention yet was made in the aforesaid quarter Generall; It is agreed on both sides, to depute two Captaines on each side, with full authority and power, to determine, and end the said difficulties, which were aggreed vpon the 17th of October 1622. in the village of *Calmpthout*, where these points following were concluded and agreed on; betweene Capitaine *d'Aubermont*, Captaine of a Troupe of Horse and Captaine *Fourdine*, Captaine of a Companie of highdutchies, deputed on the one side, and Monsieur de *Broecham*, horse Captaine Drossard of Bergin op Zoom, and Sr. *John Hackett* Lieut. Colonell on the other side.

1. Imprimis that the said Generall quarter made the 14th of May 1602. shalbe hensforward punctually kept, and observed.

2. To come to an ende then, and to release, and sett at libertie all souldiers, which are detained in prison at his present on both sides: It is agreed, that they shall all of thē be sett at libertie, in paying their rāsomes, and 25 dayes expenses, according to the ordinairy Taxation in the generall quarter.

3. That all souldiers prisonners, which haue not bin prisoners 25 daies as aforesaid, shall not lye in prison, or be detained; but pay proportionally for so many daies, as they haue bin taken prisoners.

That all prisonners on both sides included in this treatie, and in the Generall quarter shalbe ransomed with in the time of the 24th day of this present month.

5. And if any Captayne be failing herein, & sends not for them vpon the 24th of October, to ransome and release his souldier, according to this present agreement, he shal pay the charge of the dayes, which shalbe ouer and aboue the 24th of October.

6. That aswell on the one side, as on the other all Captaines and officers, which haue prisonners taken, shalbe commanded not to omitt the sending of their ransomes, and the expenses of their souldiers prisoners, according to the agreement abouesaid.

7. And for asmuch as in the generall quarter, one cannot know in what place the quarter ought ordinarily to be kept, which causeth often disputes: It is agrced on, that the quarter shalbe kept, and obserued in all places, where *Contribution* is payd, with the consent, and will of those that are owners of the same places, as also in Neutrall Countries.

8. And seing that in the aforesaid Generall quarter, many of the superiour, and chiefe officers, as also some of the inferiour, and meaner officers, and others; having pay aswell on the one side, as on the other, are not included therein: Wee declare that henseforward, all those which are not comprehended in the generall quarter aboue mentioned, of what quality soeuer they bee, and which are bound to follow the armies on both sides, shall enioye the benifitt of this quarter, vpon condition of paying sixe months of their entertainments onely the two Generalls excepted.

9. And because in one of the articles of the quarter, there is a *clausule*, that Captaines, and other militaire officers having in their possessiō some other charge, or Commission then militaire, should not be included in the aforesaid Generall quarter, it is intended, that they onely shalbe comprehended in that article of the quarter of their militairy charge, without paying any other ransome.

10. And seing in the Generall quarter, there is noe mention made of any posts, or Messengers, it is agreed on, that all Messengers, or posts being taken a horsback shalbe ransomable for the ransome of a horseman, and those which goe a foote for the ransome of a private souldier: vpon condition that vnder such a pretext, or coulour noe man of quality maye passe, who indeed ought to take noe such office vpon him.

11. It is likewise agreed vpon, and is intended, that all Traitours. Runnawaies, Malefactours sentenced and banished by Iustice; shall not be included in this accord, but to all others they shalbe bound to giue quarter that are so taken prisonners, aswell on the one side, as on the other, though one is not bownd to giue quarter to those persons aboue said.

12. And seing in the Generall quarter, there is an *Auditor* of the ordinance nominated, where as indeed there is none. It is intended, and is agreed on, that vnder the same article the particular Auditours of garnisons, Regiments, & Tercias shalbe included, and touching the Auditor Generall, and his Griffiers, in the Armie of his Catholique *Maiestey*; and the *Fiscall*, and his Griffier in the army on the side of the States of the vnited Provinces, they shalbe comprehended in the eight Article mentioning the superiour, and chiefe officers, and the meaner officers, and others, which are not included in the former Generall quarter.

All which Articles shalbe punctually obserued, & kept on this side, in witnessé whereof we haue signed herevnto. Giuen in the Army at *Brecht* the 18. of October 1622. And was signed *Ambrosio Spinola.*

By order from his Fxcie. And was subscribed *De la Motte.* And sealed with the seale of armes of the said Lord Marquesse in red waxe. And translated out of French into Dutch, and out of Dutch into English, and is found to agree with the originall. *Ian van Dalen* Griffier.

THE

LAVVES, ARTICLES AND Ordinances touching marshall discipline.

Sett downe, and eſtabliſhed by the Lordes the States, the 13. of Auguſt. 1588.

WHereas by daily experience, many diſorders are found, to growe amongſt thoſe that beare armes, tending to the great dāmage of theſe Countreys, and prejudice of the gouvernement thereof, which notwithſtanding are not any where ſo puniſhed, as in reaſon they ought, becauſe there is no certaine order, or lawe touching like matters as yet decreed and publiſhed: The States generall of the vnited Provinces have therefore (with th'advice of the Councel of State of the ſame) ordayned, appointed, and decreed, doe by theſe preſents ordayne, appoint, and decree the orders & laws here enſuing, which is their wil, to have from point to point ſtrictly obſerved, and followed by all thoſe, that beare armes in their ſervice, To which end, they shalbe every where published, and accordingly ſworne to by the ſouldiers.

I.

Firſt, he that shal take the Lordes name in vaine, or blaſpheme the ſame, shal for the firſt time make an honorable amends, and be kept three dayes in priſon at bread and water: The ſecond time he shal have a glowing iron thruſt through his tongue, then be ſtripped to his shirt, and ſo banished our of the vnited Provinces.

II.

The like penalty shal they incurre, for the firſt and ſecond tymes, who shal eyther doe, or ſay ought in deſpite, or deriſion of Gods worde, or the Miniſters of the Church.

III.

All wilfull murthers, rapes, adultery, fyring of houſes, thevery, violence, outrage, falshood, and other like bad facts, and open offenſes, or vnnaturall abuſes, shalbe puniſhed with death.

IIII.

None shall any way outrage, ſtrike, knock, beate, threaten, or diſhoneſtly touch any widowes, maryed, or vnmaried women, or ſuch as are in childbed, or with child, nor any young children, on paine to be diſcharged without money, or paſport, or els puniſhed corporally, according to the quality of the offenſe. Likewiſe all common whores shal for the firſt time bee expulſed out of the Campe with shame, and being found there, the ſecond time, shalbe ſoundly whipped and banished.

V.

He that shal have done, or conſpyred ought againſt the States, the Countrey, Townes, or other places, thereof, or againſt any Governours, or Captains in the ſame, whereby the publique ſtate of the Land may be in any ſort endammaged, or endangered: as alſo whoſoever shal conſent therevnto, shal without any mercie bee hanged.

VI.

The like puniſhment shal they alſo incurre, whoſoeuer he be that hath knowlegde of any ſuch matter, and shall not reveale it to their Captaine, or chiefe Officers.

VII.

None shall rayſe any mutiny, or make any vnlawful aſſembly, on whatſoever ſecret, cloaked, or other prerences what ſoever it be, but shall giue notice thereof to their Commaunders, on paine of hanging.

VIII.

In like sort shal they also bee punished, that shalbe present at such assemblies or call, stir vp, and incite any to be present thereat. And it is to be vnderstood also, that such Officers as shalbe at the like seditious meetings, shall receive punishement before all other souldiours, except those (that are noe authors thereof.)

IX.

He that shall speake ill of the States generall, or particular, the Councel of State, or other Superiours, or shall speake ought to despite, or deride any of them, shal without mercy be punished with death.

X.

He that shal have spoken any wordes tending to sedition, mutiny, or disobedience, or that having heard such wordes, and shal not presently acquaint his Captaine therewith, shalbe punished with death.

XI.

In like sorte shal they also be punished, who rehearse any such words in presence of private souldiours, eyther of themselves, or by suggestion of others, or practise ought, whereby any mutiny, or sedition may growe.

XII.

No man be it out of garded, or besieged places, or in other like cases, shal vse any speech, or correspondence with the ennemie, nor send him any messages or Letters, nor receive any from him, nor deale in like sorte with any of his confederates, bee it in secret or publicque, without the consent first had of his Gouvernour, or Cap. or that the make it foorthwith knowne vnto him, vnlesse he be thereto authorised. Neyther shall any man be adherent or in any sorte assistant to the enemy, on payne of death.

XIII.

Likewise none shal conferre or converse with any Trompet or Drumme of the enemies, or any other sent on a message from him, but they onely who are thereto appointed, on paine of death.

XIIII.

None shall in going, departing, lying still, mustering, or in garnison doe outrage, or spoyle to the inhabitants of these Countreys, their favorours, or confederates or take from them any victuals, money, or ought els, without paying duely for the same, nor yet throw downe, or spoyle any water-mils or water-works, nor set on fyre the same, or other houses, or the campe, at the breaking vp thereof, without special commaund from the General, or other Chiefe Officer, on payne of death.

XV.

Likewyse none shal eyther doe, or practise ought against any persons, Townes, Villages, Forts, Havens, or whatsoever goods warranted by pasportes, or other assurances from the Generality, on payne of death.

XVI.

He that wil departe from one Company to another, or elswhere, or will leave the Colours vnder which he serveth, is to have a sufficient pasport from his Cap. or Commaunder, and failing therein, shalbe punished with death.

XVII.

VVhat soever Captaine shall entertayne souldiours, without a lawfull discharge from their former Cap. shalbe punished with death.

XVIII.

If any souldiour (serving on horsse or foote) shal beate or strike his host, hostesse, their man, or mayde-servant, he shall for the first time be kept three dayes at bread and water, the second, make an honourable amendes, and before the whole watch bee disarmed, and then banished out of the Company, And if the party so striken be maimed, or bloud drawne, then shal the souldiour offending have his hand striken of.

VVhosoe-

XIX.

VVhosoever shal have taken, or stolne any victuals, or other provisions brought vp, towards the Campe, Garnison, or any Towns, or places vnder the jurisdiction of the States generall, shalbee hanged.

XX.

Likewise none shal out of the Campe, or Garnison forcibly take, or els buy vp before hand, any victuals, or goods bound thitherwardes, before the same shalbe brought to a fit place for saile, and taxed: Neyther shall he robbe any cabbin, shop, tent, Victualer, or Marchand that is there, for the helpe of the Campe or Garnison, on payne of death.

XXI.

He that shal goe out of the quarter from his Colours, or Garnison, further then a Canonshot, without his Captaines leave, shalbe punished with death.

XXII.

Whosoever shal goe out of the Campe, besieged towne, fort or other place, without the speciall consent of his Captaine, or Officer, for any cause, bee it for forrage or ought els, shalbee hanged.

XXIII.

VVhosoever shal take any Cattaile, or beasts within the landes, that lie vnder the obedience of the Generality, shalbee punished as a Theife.

XXIIII.

He that in marching by land towardes the fielde, or in returning thence, shal forsake his Colours, or Cornet, shall without any mercy be punished with death.

XXV.

And whosoever (not being visited with manifest sicknes, and thesame knowne to his Cap. or Commaunder) shal keepe along with the baggage, or ride on the waggons, shalbe disarmed before the whole Company, and then banished without money or pasport.

XXVI.

If any shal neglect his watch, or other service committed vnto him, he shalbe punished with death.

XXVII.

If any souldiour shalbe found sleeping on his centinel, he shal without any mercy be punished with death.

XXVIII.

VVhatsoever souldiour shal, eyther by day or night departe from his centinel, where he hath bene placed by his Corporall, vnles he be called thence, or relieved by the said Corporall, shall receive punishment of death without any mercy.

XXIX.

None shal declare or make knowne the watch-word to the enemy, or any other, nor give any other word, then is given him by the Officer, on payne of death.

XXX.

VVhosoever shal absent himselfe out of the Courte of garde above two heures in the day time, or any with in the night, without his Corporals leave shalbe punished with death.

XXXI.

None shal without lawful cause rayse any tumult, make an alarme, or discharge a piece by night, or make any noyse, or doe ought els, whereby the same may growe (without cause) on payne of death.

XXXII.

He that shal presume within the Campe, Quarter, or place, where he lyeth in garnison, as also after the watch is set, to drawe his weapon shal forfeict his life: as also if he doe it out of the Campe Towne, or place, without leave of his Officer.

XXXIII.

He that shall strike any man with his sword vndrawne, or with a cudgel, stone, or otherwise, that bloud followes, shal loose his hand.

XXXIII I.

He that shal give any one a boxe on the eare, shall in presence of the Company take the like boxe againe of the party so wronged, and besides be disarmed, and banished the Company.

XXXV.

No souldiours shal without order from their Chiefs, Captaines, or Commaunders hold any common meeting or gathering together, bee it to demaund money, or ought els, nor yet be present at such assemblies, on payne of death. Provided always, that such Capt. or Commaunders as shal suffer the same to happen at vndue seasons, and in vnlawfulwise, shal (for an example to others) bee punished with death before all the souldiours.

XXXVI.

If any shall call for money as they are marching in the face of the ennemy, or vpon any enterprise, they shal receive punishment of death without any mercy.

XXXVII.

If it chance that the monethly entertainement bee not payed on the very day, or that it cannot bee sent vnto the souldiours for some cause, be it through any hinderance of the enemy or otherwise, none shall therefore make any tumult, or speake seditious wordes, or seeke to force his Captaine to the payment thereof, neither yet doe the lesse duty, but shall haue a care of his marches and warches, contenting him selfe with a reasonable loane, vntil the money be come, or maye come, & he shall fully performe the dutire required of a good souldiour. And whosoever doth the contrarie, or accompanieth those that doe it, shalbe punished with death.

XXXVIII.

Noe Captaines, Lieutenants, or Ensignes shal depart out of the place where their Companies lye in garnison, whether it bee to solicite for payment of their said Companies, or vpon their owne busines, without leave of their Commaunder, or Governour, on payne of death.

XXXIX.

He that in anie quarrell, fight, or otherwise, shal call those of his nation to helpe, or gather an assemblie, shalbe hanged.

XL.

He that shalbe found by day, or by night out of the campe, or a place besieged, without his Captaines leave, shalbe punished with death.

XLI.

VVhosoever shal goe on fre-booting, and commit spoyles, extorsions, and theft, shalbe hanged.

XLII.

If one souldior challange another into the field, without leave from him that commaundes in that quarter, hee shalbe punished with death.

XLIII.

If any Corporal, or other commaunding the watch, shall suffer two souldiours to goe foorth to fight, he shall without mercy be punished with death.

XLIIII.

Any souldiour being wronged by word, or deed he shall repayre to him that commaundes in the quarter, who after the hearing of both parties shall cause satisfaction of the wrong to be made vnto the party interessed, with bare head, and in presence of the whole watch: And if he finde cause, shal also disarme the wrong doer, and banish him out of the Company.

And

XLV.

And if there bee no witnes of the quarell, then shall the sayd Commander cause the parties to agree in his presence, whereto if they will not condescend, then both, or hee that denies it, shalbe disarmed, and banished out of the Company.

XLVI.

VVhatsoever souldiour or Commaunder shal goe out of the campe, Towne, or fort, or enter thereinto by any other way, then at the ports, and ordinary entrances shalbe hanged.

XLVII.

If any souldiour shall refuse the commaund of his Cap. or any other, who commaundes over him in the seruice of the States General, and not performe thesame, hee shalbe punished with death: as hee likewise shal, who transgresseth any of the Generals commandments published by sound of drumme, or trumpet.

XLVIII.

At the sounding of any alarme every one shall resort to his Ensigne, or Cornet, and whosoever comes not thither (vnlesse it be on apparant necessitie,) or runnes to an other place, without consent and speciall order from his Commaunder, or comes not so soone as his Ensigne, shalbe punished with death.

XLIX.

Every souldiour shal aide, and defend his Coulours by day and night, and on the first warning repaire vnto them, not departing thence, vntill it bee brought into a place of safety, on payne of death.

L.

If any shal depart out of the order, or ranke wherin he is placed, vnlesse it bee on necessary occasions, and that he hath therewith acquainted his Officer, hee shalbee punished with death.

LI.

He that shall first beginne to flye in a battaile, or vpon an assault, may lawfully be slaine thereupon by any one: And if he escape, hee shalbee declared a villaine, and receive punishment of death without mercy.

LII.

None that is appoynted for the defense of any breach, trenche, or skonce, bee it Captaine or Souldiour, shall willingly forsake the same, or through any false, or coulored occasions, or excuses absent himselfe from thence, without sufficient order, or warrant allowed by Councel of warre, on payne of death.

LIII.

None shal surrender, or deliver to th'enemy any place, which the keeping thereof is committed vnto him, on payne of death.

LIIII.

Likewise none shal runne from his quarter in a besieged place, call for composition, or speake thereof, bee vnwilling to fight, labour, or defend their quarter, or make others vnwilling therevnto, or doe ought els in such a place, whereby the defense thereof may be hindered, on payne of death without any mercy.

LV.

If any man runne away to th'enemy, or in his flight bee taken from th'enemy, hee shalbe punished with death.

LVI.

No Captaines shall seduce, or intice away each others Souldiours on payne of death.

LVII.

VVhosoever shal by word, or deede busy himselfe with the Sergeant Maiour, doing his office, bee hee Captaine, or Souldiour, he shal without mercy be punished with death: As he also shal, who wil not content himselfe with that quarter, or lodging, whereto he shalbe appointed by his Quartermaster, or Furrier, or he that will disturbe another man in his place.

LVIII.

If any souldiour having the watch, shal come to his Colours not fully armed, to march

with the rest vnto the watch, he shall for the first time, bee kept three dayes at bread and water : the second disarmed and banished for three Moneths out of the company, and the third time suffer death.

LIX.

Every one, of what condition soever he bee, shall forthwith, or before the evening bring before him that commaundes in the quarter, all such prisoners, as shalbe taken of th'enemy, on payne of forfeicting the said prisoners, and to bee punished besydes with death.

LX.

And if any shall take prisoner a Generall, Commaunder, or other man of accompt of th'enemy, he is foorthwith to present, or cause to bee presented the sayd prisoner vnto the States generall, or Councell of State, and with-all to deliver him over, as also whatsoever other prisoners they wil take to themselves, receiving therefore a reasonable reward according to the quality and ability of the prisoner: provided that it exceeds not the somme of 5000. gilderns: And so the said prisoner shalbe at the disposing of th'aforesaid States, and he that tooke him, to pretend no further interest in that behalfe.

LXI.

Likewise none shal kil any prisoner, or set his ransome, or after the payment of the said ransome, suffer him to depart without leave of the General, or him that commaundes in the quarter, on paine of being disarmed, and banished out of these Countreys,

LXII.

And if any prisoners bee found, walking along the Campe or place of garnison, without leave from the General, or him that commaundes there, he to whom the prisoner belongeth, shall forfeict him to those, who shall first lay handes on the prisoner.

LXIII.

Concerning lawful prizes, whosoeuer bring in the same, shall acquaint therewith the Generall, or him that commaundes in the quarter, within three houres after their returne, to th'end they may bee accordingly registred, on payne of forfeicting the same, and to be besides punished on the bodie.

LXIIII.

VVhosoever shal haue gotten any thing vpon the enemy, and giveth not notice thereof as aforesaid, that it may be recorded, aud after solde in the Campe, or place of garnison, but shall sell, or cause it to bee sold in the places or townes neare therevnto, shall without any mercy bee punished with death, to th'end that better order be held in all, and no man wronged in his right.

LXV.

VVhen a souldiour shall have done any offense or fault, his Captaine shalbe bound (on payne of three moneths suspension from his charge) to deliver the said souldiour into the Generals handes, or his that commaundes in the quarter, who with the Captaines, Lieutenants, and Ensignes then present, shall vpon th'information, which hee shall cause to be taken thereof, judge according to these orders and lawes.

LXVI.

He that is drunke on his watch-day, shalbe cassiered, and banished out of the Comnany.

LXVII.

Item if any one drinke himselfe drunke, and in his drunkekenneſſe commit any ill or ought forbidden, hee shal not thereby bee excused, but so much the more sharpely punished.

LXVIII.

If any Cap. or souldiour shall refuse the muster, or review, hee shalbe cassiered.

LXIX.

None shall at the muster let himselfe be entred by a changed, or other name, then his owne, nor shall passe muster with a borrowed horsse or armes: neyther shal any on the musterday lend the like, on payne of being disarmed, and banished out of the Company.

LXX.

None shal let himselfe be entred, or muster vnder two Companis, on payne of death.

None

LXXI

None shal diminish or pawne his armes, which are appointed him by his Captaine, on payne of being disarmed, and banished for sixe moneths out of the Company.

LXXII.

None shal likewise take or pawne any souldiours armes, on payne of loosing double the worth of the pawne.

LXXIII.

None shal play away, or quite his armes, but keepe thesame alwayes cleane, and serviceable, on payne of being cassiered out of the Company without pasport.

LXXIIII.

None shall by consenage get away his fellowes provisions, victuals, or armes, on payne of being disarmed, and banished for three moneths out of the Company, or els besides, of sustaining corporal punishment, according to the quality of th'offense.

LXXV.

He that shl presume to set vpon a Commissary of the musters, or wrong him either in word or deede, shalbe punished with death.

LXXVI.

If any Captaine give his souldiours lesse then the pay allowed him by the States, he shalbe disgraded.

LXXVII.

If any souldiour proffer to drawe his weapon against his Chiefe, or Commaunder, he shalbe punished with death.

LXXVIII.

If the Provost or his Officers apprehend one or more souldiours, none (of what degree soever) shall oppose himselfe thereagainst, or reskewe, or attempt to reskewe the said prisoners, on payne of death.

LXXIX.

Furthermore, no Officer nor Gentleman of any Company of horsse, or foote, or any cõmon souldiour shal victaile in any Campe, without the Generals special consent, on payne of being disarmed.

LXXX.

Likewise all Victualers that victual in the Campe, shalbe subject to th'aforesaid articles and the Councel of warre there being, on the penalty here in contayned, and shall not draw any wine or beere for any one in the evening, an houre after the Sunnes setting, or in the morning asmuch before the rysing thereof, on payne of forfeicting 3. gilderns for every time they shalbe found to have done so: the sayd forfeict to be converted, th'one halfe to the Provosts behoofe, and th'other to the reliefe of the poore.

LXXXI.

All other abuses and offenses not specifyed in these Orders, shalbe punished according to the ordinances, lawes, and customes of the warre.

LXXXII.

And if any souldiours should not bee present at the proclayming of these orders and lawes, they shall notwithstanding bee asmuch bound to th'observation of them, as the other who were present. But to th'end none may pretend ignorance, and every one have notice thereof, the States General have given order, that the same shalbee every where published on the muster-day, and charge the Commissaries to cause all the souldiours to sweare accordingly therevnto.

THus done and decreed at Arnhem, after sundry conferences had herevpon with the chiefest Commaunders of these vnited Provinces. It being farther appoynted, that these orders, and lawes shalbe published both in the Campe, and whersoever els it shalbe meete and requisite, and that at every muster the Commissaries shal reade, and propound the same againe vnto the Companies The 13. of August. 1590.

By order of the Councel of State. *Chr. Huyghens.*

His Excie. Commandeth herewith, all Perſons of this preſent Armie, of what Condition, or qualitie ſoeuer they bee, to obſerve & keepe theſe poincts following, vpon the penalties therein contained.

I.

That noe man in marching shall forſake his Coullours or Cornet, upon paine of death.

II.

That noe man in marching, or quartring ſhall endammage the Inhabitants of this Land, or thoſe which ſitt vnder Safe-gard, or are Newtrall vpon payne of death.

III.

That noe man shall breake downe any churches, or Howſes, Hewe downe any fruict-trees, or ſteale any Bells, Iron worke, matterialls, or Cattle, vpon payne of death.

IIII.

That noe man without the conſent of his Commandour, shall goe further then a Canon shott in circumference without the Armie, or lie out of yt, vpon payne of a ſtrappado, and wronging any man shalbe hanged without mercie.

V.

That noe man shall fight within the quarter, or drawe his ſword, or make any great noiſe by night upon payne of death.

VI.

That noe man comming to the Armie with victualls, or Sutlers, either within or without the Armie, shall be made boote off, or robt vpon paine of death.

VII.

That noe man shall ſell any boote, or goods in the Armie, without beating the Drumme by the conſent of the Preſident of the high-Court of Iuſtice, and the foreknowledge of the Provoſt Marshall Generall, vpon forfeyture of looſing the ſaid boote or goods, the one halfe to be given to the poore, and the other halfe to the Provoſt Marshall Generall.

VIII.

That noe man shall ſell likewiſe any goods without beating the Drumme, and the fore-knowledge of the Provoſt Marshall Generall, vpon forfeyture of them, and to paye ſixe gilders beſides.

IX.

That all Chiefs, Captaines of Horſe. and foote, their Souldiers vnder them, having Committed, or being accuſed of any of theſe aforeſaid offences, they ſhall helpe to put them into the hands of the Marshall, or elſe they shalbe anſwerable for them, in caſe they refuſe, or hinder the ſame.

X.

And all Shippers and Saylers being a Land, shall as well be lyable to theſe Articles, as all other perſons.

XI.

That noe man shall doe his eaſement within the Armie, but in the places appointed for that vſe, vpon forfeiture of looſing his vppermoſt garment.

XII.

That noe man shall arreſt any man in the Armie, or ſue him for any old actions, or debts made without the Armie.

XIII.

That noe man shall oppoſe himſelfe againſt the Provoſt Marshall Generall or his men, shall howte after them, or miſuſe them in word, or in deede, vpon payne of being hang'd without mercie.

XIIII.

That all priſonners of the Ennemy shalbe delivered into the cuſtodie of the Provoſt Marshall Generall, As likewiſe all priſonners of the Armie, which are liable to bodily punishment, with a pertinent information of their offences, or accuſations, as others.

XV.

That all particular Marshalls of Regiments, Admiralitie, Artillerie, Guards, or others shall be vnder the Provoſt Marshall Generall.

XVI.

That noe man shall ſett any price vpon any victuails within, or without the Armie, without the conſent of the Provoſt Marshall Generall, and according to the rate, which is given him vpon paine of Arbitrall punishment.

XVII.

That noe man shall ſuttle in the Armie, before he hath given vp his name to the Generall of the victualls and the Provoſt Marshall Generall, vpon the forfeyture of ſixe gilders.

XVIII.

That all Sutlars comming into the Armie shall give vp a note of their wares to the Generall of the victuaills, or his Commis, neither maye ſuttle without his order, or commiſſion, vpon the like penaltie.

XIX.

That noe Sutlars shall build any Hutts, then in ſuch places as is appointed them by the Marshall vpon the like forfeiture.

XX.

That noe man shall call for, or receive any Hutt-money, but with the conſent of the Provoſt Marshall Generall vpon like penaltie to forfeyt ſo much every time.

XXI.

That all Souldiers or Sutlars killing Cattle or Beaſts, shall bring the fylth and paunches thereof without the Armie, and burie yt there vpon like penaltie.

XXII.

That noe man ſhall ſell away the right of kild Beaſts belonging to the Marſhall, vpon penaltie of paying double for yt.

XXIII.

That noe Sutlars ſhall engroſſe, or buy vp any commodities being yet without the Armie, before they be brought to the place appointed, where they ſhalbe ſould, or ſhall not ſell them before they be priſed, vpon forfeiture, that the one halfe of the ſame wares, bought or ſould, ſhalbe given to the poore, and the Marſhall aforeſaid.

XXIIII.

That noe Sutlars, Shippers, or others perſons ſhall buy or take in pawne any Iron, Braſſe, Bell-mettall, Bullets, Armes, Powder, Emptie ammunition Barrells, or any prohibited goods, vpon forfeyture of them, and beſides to be publickly whipped.

XXV.

That noe Sutlars ſhall tapp, meaſure or weighe either with liquid, or drye meaſures, elle or weight, but with ſuch as ſhalbe given them by the Provoſt Marſhall Generall, vpon the loſſe of ſixe gilders, and vſing any falſe meaſure at all, ſhall forfeyt all their goods, the one halfe to be given to the benefite of the poore, the other halfe to the Regiment of Iuſtice, and beſids to be punished arbitrally.

XXVI.

That noe Sutlars ſhall tapp any Beare, or Wine, hold any drinking, or ſhotrs in the morning before the Sunne riſing, or in the Evening an howre after Sunne ſetting vpon penaltie of looſing three gilders every time.

XXVII.

That noe man either waggonmen, Overſeers, or Conductours of Drawing-Horſes, Sutlars, or other perſons having horſes in the Armie, ſhall put, or lett their horſes feede, or run in Sowne grounds, with what ſeed ſoever the ſame be ſowne, vpon penaltie of paying a daller for every horſe, ſo often as he ſhalbe found to doe the contrarie.

XXVIII.

Aud his Excie, Commaundeth the Provoſt Marſhall Generall by theſe, to have a good and ſtrickt care for the due obſervation of all theſe points aboveſaid, and to execute the aboveſaid penalties, and forfeitures in conformitie of the ſame, his Excie, intending hereby, that hens-forward ordinarily in his Armie, they ſhalbe kept, and ſtricktly obſerved.

Thus ſtatued by his Excie in the Haghe, the 7th of Maye 1631. Aud was ſigned, *F. Henry de Naſſau*, vnderneath ſtood, By order of his Excie, and Counterſigned, *C. Huygbens*, having his Excies ſeale of armes vpon yt in Red waxe, covered with a ſquare of white paper.

PLACCATE.

VVHereas by daylie experience it is found, that manie as well Officers, as private Souldiers in the ſervice of this State, under the command and charge of his Excell. doe challenge into the field, and cauſe others to bee challenged by their ſeconds, under pretext of righting, or repairing their honours.

1 His Excell. deſiring to prevent ſuch miſchiefs and inconveniencies, as daylie doe ariſe out of the ſaid licentiouſneſſe of Duells, as farr as is poſſible for him to doe, hath found fitt and neceſſarie, to command and ordaine, as by theſe he doth ordaine and command, that all, as well Voluntiers as Officers and private Souldiers, of what qualitie ſoeuer, being under his Charge in the Service of this State, ſhall from henceforth live civilie, quietlie and peaceablie together without wronging, injuring, or offending one another, upon paine of exemplarie punishment.

2 If there ſhall happen any difference, or offence, wch doth ſeeme to the partie offended, that no ſufficient reparation can be made, that may ſatisfie him in his honour, otherwiſe then by the ſword: In ſuch a caſe, if he bee a Voluntier, or an Officer of quality, he ſhall make his complaint to His Excell. If a private Souldier, he is to adreſſe himſelfe to his Collonell, or other Officers that have the command of him, who wth the advice of other Captaines, and officers of the ſame Nation or Regiment, that ſhall be found preſent, ſhall decide the difference, or accommodate it, if it can bee done. But if it bee of that nature to require a combat, they ſhall acquaint His Excell. with it, to reſolve the beſt way, He ſhall thinke fitt for the honours of both parties.

3 The partie that ſhall have offended the other, ſhall bee bound to appeare before His Excell. or ſuch as he ſhall pleaſe to ordaine for the hearing of the difference, which if he faile, he ſhall beecalled in within three dayes proclamation, and not appearing, be banished the Land, as diſobedient.

4 He that ſhall have demanded the combatt, being judged to bee unreceaveable, having taken an offence upon too ſlight an occaſion, ſhall bee ſent backe with ſhame.

5 The offendor, that ſhall have done ſuch an injurie to another, as ſhall bee found to offend him in his honour, if he bee an Officer, ſhall bee ſuſpended from his charges, and commandes for the time of two yeares, and obliged to give ſuch ſatisfaction to the partie offended, as ſhall bee thought fitt and reaſonable. If the offender bee but a private Souldier, beſides ſatisfaction be ſhall be impriſoned three Moneths at bread and water.

6 Whoſoever ſhall challenge into the feild, in the behalfe of another, or ſhall deliver the challenge, or anie errand by word of mouth, offenſive and prejudiciall to the honor of another, or have knowledge of it, without giving notice of it where it apperteineth, ſhall bee caſſeered from all his charges and commands, and beſides banished the Land.

7 He that ſhall find himſelfe wronged or offended, and carrie his owne challenge (not having demanded leave for the combatt, as heretofore hath beene commanded) ſhall be caſſeered and banished the Land. And if he that ſhall be challenged, doth his beſt to anſwere the challenge, though he come not into the feild, he ſhall be punished as if he were the challenger. And if parties come to fight, they ſhall both be caſſeered and banished, beſides ſuch further exemplarie punishment, as ſhall bee thought fitt.

8 Thoſe

8 Thoſe that shall have aſſiſted the two parties offending againſt theſe orders, if they shall have drawen their ſwords, shall bee as well punished as the principall, according as is before declared. If they bee but ſpectators onelie, being gone thither for that purpoſe, they shall bee caſſeered, and looſe their places; As likewiſe if it bee proved that anie comming to the place by chance, and getting knowledge of the quarrel, did not doe their beſt to hinder them that fight, they shall bee ſuſpended from their places for two yeares, and as private Souldiers punished for an exemple to all others.

9 And as for voluntiers, as long as they shall live in theſe Provinces, they shall bee bound to the obſervation and penalties of all the former articles, even as thoſe that are in actuall ſervice.

All Wch. points, and articles His Excell. doth command to bee punctualie and ſtrictlie obſerved without anie contravention, excuſe, or hope of pardon whatſoever. Given at the Haghe the 3. day of Iuly, Anno 1627. And was ſigned *F. Henry de Naſſau.* Vnderneath was writen. By Ordre of His Excell. *C. Huygens.* Sealed Wch. the privie Seale of his Excell. in redd waxe.

A

Liſt of the States pay, and entertainements for a troupe of Horſe, and a Companie of foote euery long month, or two and fortie dayes, as followeth.

Firſt for a Companie of Curaſſiers.

THe Captaine 250 *gilders for his owne entertainment, and ſixe horſes for each* 25 *gilders, provided that he preſente them with his men armed at the Muſters facit* 400 *gilderss.*

The Lieutenant 70 *gilders for his owne pay, with foure horſes to be preſentted as above facit* 170 *gs.*

The Cornet for his pay 60 *gilders with three horſes to be preſented as aforeſaid* 153 *gs.*

The Quartermaſter with two horſes 50 *gs.*

Two Trumpetters each 40 *gilders* 80 *gs.*

The Clarke or Furrier above the 80*th penny of the pay being preſent with a horſe* 30 *gs.*

The Smith with a horſe preſent 30 *gs.*

Item 25 *appointed Curaſſiers each with their baggage horſe at* 40 *gilders, with the advantage of* 12 *gilders for* 3 *Corporalls, facit* 112 *gs.*

Item 10 *horſemen each at* 25 *gilders facit* 270 *gs.*

Item 23 *Horſemen each at* 26 *gilders facit* 598 *gs.*

More for 23 *Horſemen at* 25 *gs. facit* 575 *gs.*

Summa for theſe 100 *horſemen amongſt them* 25 *gilders Curaſſiers provided with baggage horſes every* 42 *dayes facit* 3350 *gs.*

A liſt of a Companie of a hundred armed Harquebuſſiers ſerving a horſeback.

THE Captaine for his entertaynment 200 *gilders, ſixe horſes, each at* 23 *gilders to be preſented at the muſters & armed with ſufficient men facit* 338 *gs.*

The Lieutenant 65 *gs. and for foure horſes as aboveſaid facit* 157 *gs.*

The Cornett 55 *gilders, with three horſes as aboveſaid facit* 124 *gs.*

The Quartermaſter with two horſes 46 *gs.*

Two Trumpetters each at 40 *gilders* 80 *gs.*

The Clarke or Furiar beſides the 80*th penny of the pay being preſent with a horſe.* 26 *gs.*

The ſmith with a Horſe preſented 26 *gs.*

More 15 *horſemen at* 27 *gilders* 405 *gs.*

More 15 *horſemen at* 26 *gilders* 390 *gs.*

More 10 *at* 25 *gilders* 250 *gs.*

More 15 *at* 24 *gilders* 360 *gs.*

More 26 *at* 23 *gilders facit* 598 *gs.*

Summa for a hundred of Harquebuſiers every 42 *dayes facit* 2800 *gs.*

The liſt of a Companie, of foote of 135 heads.

The Captaine	150 *gs.*
The Lieutenant	45 *gs.*
The Enſigne	40 *gs.*
2 *Sariants*	48 *gs.*
3 *Corporalls*	48 *gs.*
2 *Druummes*	24 *gs.*
A Clarke	12 *gs.*
A Chirurgian	12 *gs.*
A Provoſt	12 *gs.*

For theſe 13 *Officers of a foote compa.nie every* 42 *dayes* 391 *gs.*

Item 45 *pikemen whereof one of them at* 18 *gs. one at* 16 *gs. one at* 15 *gs.* 2 *at* 14. *gs. five at* 13 *gs.* 15 *at* 12 *gs. and* 20. *at* 11 *gs.* 10 *ſts. facit* 552 *gs.*

Thirtie Muſketiers (to witt) five at 13 *gs. thirteene at* 12. *gs. and* 12 *at* 11 *gs.* 10 *ſts. facit in all* 559. *gs.*

Foure and fortie Callivers 12. *at* 10 *gilders, and* 33 *at* 9 *gs.* 10 *ſts. facit* 424 *gs.*

Three pages each at 8. *gs a peece facit* 24 *gs.*

Summa Totalis for theſe 135. *heads every* 42 *dayes facit* 1750 *gilders.*

But fore aſmuch as of late yeres there are now not Callivers in a foote Companie, it is found fitting to give two gilders to every ſouldier both Gentlemen and Centinell, to the one full meanes, to the other a freckonig & that according to the States liſt aboveſaid. *gilders. ſts.*

The pay or ordinance for a hundred heads every 42 *daies amounts to* 1398 *gilders.* 9 *ſts.*

A Companie of 120 *heades every* 42 *daies*	1638	9
A Companie of 150 *heads pro rato*	1993	17
A Compauie of 200 *heads every* 42 *daies is*	2585	18
A Companie of 250 *heads the ordinance amounts to being compleate*	3185	18

The Entertaynments, of the officers of the Feild every 32 daies.

The Coronels Entertayment ſince the reducement	300 *gs.*
The Lieutenant Coronells, ſome 120. *others*	100 *gs.*
The Sariant Maiours, ſome 80 *& ſome*	60 *gs.*
The Quartermaſters ſome 80 *& ſome others*	50 *gs.*
The Provoſt Maſhalls	40 *gs.*

The List for Shipping.

STatuated by the Lords the States of the vnited Netherlands, how many last of shipping every Companie is to have, according to their commission going out of their garnison to the Armie, or returning home againe to their garnison from the Army made the 24th of March 1632.

Imprimis a Companie of a hundred Heads is to have	60 *last.*
A Companie of 110 heads is to have	66 *last.*
A Companie of 120 heads is to have	72 *last.*
A Companie of 150 heads is to have	87 *last.*
A Companie of 200 heads.	112 *last.*
A Companie of 250	140 *last.*

Note that every last makes two English Tonns so that a Companie of 120 heads must have 144 Tonns.

But when a Companie changes garnison, and is transported to an other, they shal have more allowance, in regard of their wiues, childeren and baggage, who shalbe accommodated according to this list following.

A Companie of 100 heades	80 *last.*
A Companie of 110 heads	88 *last.*
A Companie of 120 heads	96 *last.*
A Company of 150 heades	117 *last*
A Companie of 200 heades	152 *last.*
A Companie of 250 heades	178 *last.*

The States list for allowane of waggons.

The Coronell for his owne person	2
Besides as many as the prince gives him by act	9
The Lieutenant Coronell for his owne person	1
The Sariant maiour for his owne person	1
If the Regiment be 12 Captaines each Captaine is to have one facit	12
The Quartermaster and Provost betweene them	1
The Preacher and Waggonmaster betweene them	1
The Chirurgian of the Regiments for his chests	1

Summa for a Regiment of 12 Companies in the feild with the Officers 19 *waggons.*

FINIS.

THE

SECOND PART OF THE PRINCIPLES, OF THE ART MILITARIE;

Practized
In the Warres of the Vnited Provinces.

Conſiſting of the Severall Formes of Battell, repreſented by the Illuſtrious MAURICE PRINGE OF ORANGE, of famous Memorie.

And his highneſſe Fredrick Henry Prince of Orange *that now is, Lord Generall of the Army of the high & mighty* Lords *the States Generall, of the United Netherlands, &c.*

Together with
The order & forme of Quartering, encamping, and Approching, in a warre offenſiue, and defenſiue.

VVith a Brieſe diſcourſe of Cavallerie, or Horſemen.

Compoſed by HENRY HEXHAM, Quartermaſter to the Regiment of the honorable *Colonel Goring.*

PRINTED AT LONDON,
For Mr *Robert Younge*, ANNO 1638.

To the truely honorable *Mr George Goring*, Son and Heire to the *Lord Goring*, Lord Gouvernour of his Maties Frontier Towne of *Porchmouth*, and Colonell of an English Regiment, in the seruice of the Lords the States Generall of the United Provinces, vnder the Commaund of his highneſſe the Prince of Orange.

Right worthy Colonell.

ACcording to my promiſſe and weake abilitie, I have compoſed and finiſhed this ſecond part of the principles of the *Art militarie*, for ſo much as concernes the duties of the officers of the Feild, belonging to an Armie, and the diverſe orders, and formes of Embattailling of Horſe, and Foote, repreſented at ſeverall times and in ſundry places by the two famous Generals of our age, *Maurice Prince of Orange* of happie memoire, and *Fredrick Henry* his highneſſe the *Prince of Orange* that now is our *Generall.* Together with the order of quartering, encamping & approaching in a warre offenſiue & defenſiue. This I have done having gathered it out of diverſe good Authours, for the inſtruction of ſuch, as are deſirous to follow the profeſſion of a Souldier, and it comes in moſt humble wiſe, to crave your gracious patronage, as one to whome I acknowledg my ſelf much bound unto, for your manifould favours, which if it be acceptable unto yow: it ſhall not onely give mee encouragement to fall on upon a third part: but alſo to pray unto the Almighty, for the recouverie of your health, and ſtrength with much encreaſe of honour. Reſting.

Yours honours ſervant, & Quarter-maſter ever te command.

Henry Hexham.

THE SEVERALL DVTIES OF THE OFFICERS OF THE FIELD BELONGING TO AN ARMY.

And first of the Provoſt Marshall of an Army.

BEcauſe in the nature of his office, he is to execute all directions, and Commandements, that he ſhall receiue from the Lord Generall, or Marshall, he shal be enioyned to giue, his attendance vpon the Lord Marshall. It is his office to publish all Proclamations, orders and decrees of the Generals, and all things elſe that are to be notified to the Troupes, as the Lo: Marshall shall command him. He shall ſee them published in the Generals quarter, and before the head of euery Regiment, being attended on by the Provoſts of euery Regiment. He shall haue the keeping of the priſoners in the armie, that is to ſay, He shall by himſelfe, and his men keepe the chiefe priſoners, and shall direct the Provoſts of euery Regiment, how the Priſoners in their charge shal be kept.

He shall haue thus far forth Commaund over all the Provoſts in the Armie, as they shall giue an account to him of all the Priſoners they haue, of the quality of their offences, and of the Information againſt them, yea as often as he shall direct and shall giue vp an note, as well of his owne priſoners, as of the reſt, once euery weeke to the Lord Marshall.

He shall attend euery Court day at the Generals, or the Lord Marshals, if it be held there and shall bring his Priſoners that are called for ſafely to the Court, with ſuch Informations and witneſſes, as are to be brought in againſt them: and shall after they haue been heard, and proceeded withall, bring them back in ſafety, and ſo keepe them, till he haue attended and knowne the further will of the Generall, or in his abſence of the Lord Marshall. Alſo he shal be bound to haue his Executioner, A place of execution, and all things belonging vnto it, whenſoeuer, or whereſoeuer he shalbe commanded by the Generall or Marshall, and he shal ſee the ſaid executions ſo commanded duely performed.

The Provoſt Marshall shall haue thus farre Commandement, ouer the Victuallers of the Armie, that he shall aſſigne their quarter in euery Regiment, and shall appoint what victuals are to attend euery Regiment. Alſo he shall giue order to the Provoſts of euery Regiment, that they ſee no victuals ſold, but at conuenient houers, and that the prices of victuals and beere be reaſonable, & euery kan of beere ſold at that price, as he hath marked it vpon the Barrels head, and as is appointed him.

It is further incident to his Office, to haue account brought vnto him of all preyes of Cattell, and other victuals that are brought into the Armie, and that the ſame prey, aſſoone as it comes into the quarter, shal be shewed to him, and by him to the Generall, or Commiſſarie Generall of the Victuals, becauſe it may be knowne, both whether the preyes be lawfull, & how they ought to be diuided.

He shall by the Provoſts of euery Regiment and his ſervants, cauſe all entrailes of Beaſts, that are killed in or neere the quarter, and all other Garbage and filth to be buried, and that in all things elſe the quarter be kept ſweet, and the places adioyning cleane, and that the places of Eaſement pricht out in ſuch a conuenient diſtance, as he shall in diſcretion ſet downe, and that he himſelfe as often as he can conueniently, shall viſite the whole quarter, and shall cauſe the Provoſts of Regiments, and his owne men to viſite the ſeverall parts of the quarter euery day.

He shal haue all fees, aſwell in preys that are taken, as in his ſervice of the overſight of Victuals and Beere, and of all things els, which doe properly, and uſually belong to the Provoſt Marshall of an Army.

Of the Marshall of a Regiment.

THe Marshall of a Regiment, is to receiue and keepe safely all such Prisoners, as are committed to his charge by the chiefes, Captaines & Officers of the Regiment, and shal bring his Prisoners to the Marshal Generals, or to a Court of Warre, whensoever they shalbe called for, or brought to Iustice.

It is also the charge of the Provost Marshal of a Regiment, to take speciall care, that all Women, Lackies Servants, Bread, & Brand-wine-men, belonging to the Regiment shall march after their owne Regiment, and not before, or vpon the flanckes thereof.

It is his duty also, to set such Prizes vpon Beere, and Victuals, as the Lord Marshall or the Sariant Majour Generall have appointed, which order he receiveth from the Provost Marshall of the armie, sees it duely executed within the circuit of the Regiment, that the Sutlars may not sell their Beere or Victuals above the set rates, to grate vpon the souldiers. After the Captaine of the Watch hath gone the first Round, he is to see also that the Sutlars keepes no drinking and diforder in the night, but to put out their Candle-light and fires.

And during the time of divine service, he is to goe the Round, and to see there bee no tipling, or disorders committed in the Regiment.

The Office of a Quarter-master Generall.

FIrst he is to be at all remoues, and before the taking vp of any Quarter, is to attend the Generall, or the Marshall of the Feild to receiue his direction, where and in what place the Armie is to be quartered, and how the Avantgard, the Battle, and the Reergard shal be distinguished.

Hauing received then his directions, and the Armie drawing neere vnto the place dessigned, he, & the Quartermasters of everie Regiment, rides before with a Guarde of Horse & some firelocks to view and make choise of the Ground where the Armie is to be quartered, & there ordaines a Quarter for the Generall, the cheife Officers of the Feild, and their traines, together with the Regiments of everie *Tercia*, and giues out the ground, or lodgings to the Quarter-master of each Brigade, and they to the perticular Quarter-masters of euerie Regiment, who drawes out the Quarters in that order and forme, as the Generall hath prescribed and as the figure thereof following shall demonstrate.

It is also his office to direct the Quartermaster of every Regiment, that they observe, in laying out their quarters, the same forme as the General hath commanded, that is, proportiõ for proportion, and to see that all places of Armes, streetes, sallies, and all things else be answerable, which being done, he visites every quarter to see whether it be made and done accordingly.

The Office of a Quarter-master of a Regiment.

THe Quartermaster of a Regiment in all changes, is to attend the Quartermaster Generall, to receive his directions, and takes the place and ground appointed by him for the quartering and lodging of the Regiment, and then drawes out his quarter for his Collonel & the other Officers of the feild, & every Captaine of each Regiment, according to the order of their march, & their seignorities in the Regiment, distributing and giving to a Sariant of every Companie of the Regiment, who are to assist and attend him, the depth, bredth, and length of the quarter, with the distances of the Alarme place betweene the head of the Quarter and the Trench: and the true distance between the devision of Regiment and Regiment, as also when the Regiment is to be Quartered in Villages, and Houses, he is also to obserue that forme, and directions, which the Quartermaster Generall shall giue him.

The Office of a Trench-maſter.

Becauſe as Quartermaſter he ſhal know the ground that is layd out, ſo he is to execute the Office of the Trench-maſter in the outworkes of the quarter, as he doth of Quartermaſter within, theſe two Offices having affinity the one with the other; and therefore muſt ſett out diſtances betweene the quarter, the Trench, or Rampier, with the breadth and depth of the Ditch, be the quarter altogether entrenched, or in part, as he ſhall receiue direction from the Generall, or Marshall, and alſo the proportion of all Outworkes, Flanks, Mounts, Batteries, and other workes that shalbe appointed.

As it is showne, what is the dutie of a Trench-maſter in encamping: ſo in marching he is tyed to this, that he doth direct the makeing of wayes, or *Explanadoes* for the paſſing of the troupes, or marching of the Ordinance or Carriages, according as he shall receive direction from the Generall, or Marshall, Provided that in making way for the Artillerie, he take the Quarter maſter a long with him, aſſigned by the Maſter of the Ordinance for that purpoſe, and for the Carriages, and that the Carriage Maſter be alſo there with him.

In all Approaches he is to take charge of the Trenches, and other workes, for which after he hath received direction from the Generall, or the Marshall, he shall give directions to all thoſe that doe worke, and ſee that the workes be carryed in ſuch ſort, as they are appointed. In which ſervice all that doe worke, whether they be *Pinioners*, or Souldiers commaunded muſt obey him.

Of An Inginier.

AN Inginier ought to be a man skilfull and experienced in Arithmatick, Geometrie, and the Mathimaticks, and before he begins to breake ground, or runs his lines of Approches, he ought to conſider well the Situation of the place, and to have regard to the Proprietie, and nature of the place, whether it be high ground, low, Plaine, or hillie.

By day he viewes well the ground, that he may the better run his Approches by night, in ſetting out his ſticks and markes, that he may Place his men to gett into the ground with the more Safety, to make the Corpes de gard, and Batteries vpon the moſt advantagious places, for if he should miſtake his ground, and not run his Approch well, by turning and winding it, and Carrying it from the Bulwarkes flankes, and the, outworkes of a Towne, or Fort: he may endanger the lives of many men, and therefore it behoves him to be very Carefull and Circumſpect, but of this wee shall ſpeake more at large, when wee come to handle Approches.

The Office of the Commiſſarie Generall of the Victuals.

HE is to take charge of all the Victuals prepared for the Armie, as well by Sea, as Land-ſervice, and to ſee himſelfe or by his Miniſters the proportion of Victuals to be duly diſtributed to the Souldiers and Marriners, as the Generall, or Admirall shall direct.

All Purſers, Stewards, and all other that shall in any shipp haue charge and overſight in Victuals (as alſo all vnder Commiſſes, and Conductors of Victuals by Land) shall vpon the diſcoverie of the extraordinarie waſting, ſpoyling, or miſcarrying of Victuals preſently giue notice to the ſaid General (or Commiſſarie Generall) of the Victuals, that he may preſently take order in it.

Whereſoever the Armie shall land, March, or lodge, all the Victuals found in ſuch places shal be ſeized vpon by him, and a proportion ſet out by him for the preſent vſe of the Troupes there quartered, and the reſt reſerved as part of the Generall ſtore, and Magazine

of Victuals, and to that end he shall goe himselfe, or send his Officers, or Clarkes to attend on the Lord Marshall, when he or the Quartermaster Generall goe first to view, and take vp the Quarter.

He shall keepe a List of all the Bakers, Millers, Butchers in the Armie, and of all others that are to be used in the Provision of Victuals, to the end, he may set them a worke as occasion and the service shall require.

All Instruments for grinding, Ovens, Baking, or for preparing, bestowing, Carrying, or for the preserving of Victuals shalbe vnder his Charge, and he shall have authority to vse and dispose of them for the publick service.

If any prizes of Victuals shalbe taken at sea, the Commissary Generall of the Victuals shall both take a note or Inventarie of it, and appoint some Officer of his to take charge of it.

If any preyes be taken by land, he shall likewise have a note or Inventarie of all, and view it himselfe, he shall make the division, as he shal be directed by the Generall, or in his absence by the Lord Marshall

He shall give out noe extraordinarie Victuals, but by order and warrant from the Generall, and shall give from time to time an Account vnto him of any wast, spoyling, or miscarrying of Victuals, that shalbe in the Armie by Sea, or by Land.

The Carriage Master his Office.

HE is with as much authority, to marshall, and order all the Carriages of the Armie, as the Sarjant Majour Generall is to marshall the Troupes.

He shall see the Carriages of the Munitions first to be placed in the best, and safest places, next the Carriages of the General, and chiefe Officers of the Armie, the next by their turnes: but because the Incumbrances of carriages, may oftentimes disorder the whole troupes, he shall receive his directions from the Sarjant Majour Generall of the Armie, where his charge shall march, though the particular disposing, and ordering of the carriages be left to himselfe.

Hee shall haue three severall men, or Officers of his called Conductors, to attend vpon the severall divisions of Carriages, as sometimes vpon the Baggage of the vantguard, the Battell, and the Reereguard. Sometimes vpon the Carriages of munition, and Ordinance, the Generalls and chiefe Officers cariages, so that in the order of marching they shall be divided into three bodies, and he shall have some Smithes, Carpenters, and wheele-wrights attending vpon every seuerall division. His best order in marshalling the Carriages, will be to observe the same course, that the Seriant Maiour doth in marshalling the Regiment, the which by the Provost of every Regiment, he may give notice to all them that goe along with the Carriages.

His direction being given, he shall oversee the whole order of march for all the Carriages, and shall make the Provosts of the Regiments keepe the same order.

The Muster masters Office.

HE shall having order take a Generall-muster of the whole Armie before it be embarqued or march, and keepe a perfect List of the number of Armes, a Coppie of which List he shall deliver over to the Generall, that he may know the strength of the Army.

Hee shall make reviewes as often as the Generall, or in his absence the Lord Marshall shall appoint, and shall alter his List as he finds altered in strength, and shall keepe Notes of the alteration, betwixt every muster, and of the causes of the diminishing of the strength of the Troupes, That is to say, what men are slaine vpon service, and what are dead of sicknes, and what men are run away, or discharged by pasport.

He shalbe respected, and obeyed in the execution of his Office, and no Colonell, nor Captaine

Captaine, shal refuse to shew him their men, whensoever he shall require them from the Prince or Generall.

Of the three Cheife Officers of a Regiment.

First of the Sariant Maiour of a Regiment.

A *Sariant Maiour* ought to be a Valiant man, an old Souldier, and one that is well experienced in the way of his profession, vpon all occasion his place gives him accesse to the Generall, the Marshall of the feild and the *Sariant Maiour* Generall of the Armie, to know when, how, and in what manner his Coronels Regiment is to march, whether in one bodie alone, or else in two divisions ioyned with others.

Wherevpon he gives order how the Regiment is to be marshalled, and ordered, in what forme the Companies are to draw, and when vpon any service they are disbandied, how to really them againe as is required of him.

He receives his orders and Commands, either immediatly from the Generall himself, or from the Marshall or *Sariant Maiour* Generall as is said, whether the Regiment be to march in the *Vantgard*, the *Battel*, or the *Reereguard*, and ought to have some knowledge how the Countrie lies through which the Armie is to march, whether over a Spacious *Companie* in Battaille, or through narrow passages, over rivers, woods and the like, by drawing out of files, as the ground and passage will afford, as also what forme the Regiment is to hold, if they should be charged with horse, have ordinance playing vpon them, or troubled with much baggage.

He shall in the presence of his *Coronel*, or Lieutenant *Coronel* be an assistant to them, in seing all orders and directions executed and performed, and in the absence of them both, to have the same authority, and Commaund, that the *Coronel* himself shall have.

In marching or Imbattailing, he shall keepe as neere the midst of the Regiment as he can either in the front, the Reere, or the flankes, and so he may best overlooke, and observe the order of their March or imbattailing.

The Regiment being drawne vp in divisions, he gives to every Captaine, and Officer his place, according to his seignority, and withall commaunds the *Drummaiour* and the other Drummes to beate a march, and to move all at an instant, and see that the souldiers keepes well their rankes and files, and none disbandie themselves, or straggle.

He shall come every morning, and evening to the *Sariant Maiour Generall* of the Armie, or to the *Sariant Maiour* of *the Brigade* or *Tercia*, to receive the *Word* and orders from him, if there bee no extraordinarie cause to hinder him: and when he hath received the *Word* from the *Sariant Maiour Generall*, or from the *Sariant Maiour* of the *Tercia* his Coronell and Lieutenant Coronell being present in the Quarter he gives them first the *Word* and orders, and afterward delivers it over to the *Sariant maiour* of that Regiment, drawne in a ring according to their Captaines *Seignoritie*, which are to come and attend vpon him for the same.

As he doth receive directions for marching, imbattailing, viewing of ground, and placing of guards from the *Sariant Maiour General* or the *Sariant Maiour* of the *Tercia*: so he is to deliver them over to the Captaines, and Officers of that Regiment, and to call vpon those to whom it doth appertaine, to see them duely executed.

Everie night he is to visite all the *Guards* of the Regiment, and to keepe the turnes of the watches, and marches (that one Captaine may not doe more duty them an other) as also in sending out troupes vpon service, to the end, both the labour, and the honour may be equally devided.

It is also his dutie to speake for Amunition, as powder, Bullets, Match, and victuals for the Regiment, if there be any want, and to see them equally distributed to the Companies, according to the proportion given out, and finally to give order and proportion for the number of Commanded men, of the Regiment that are to goe to worke.

Of a Lieutenant Coronell.

THe next place above a *Sariant Maiour*, is a *Lieutenant Coronell*, which is an honorable charge, when his *Coronell* is preſent, he is to aſſiſt and obey him, in ſeeing all the Commaunds and directions, that are dilivered by any publick Officer, or ſuch as ſhal be within the authoritie of a *Coronell* himſelf, to be duely executed in the abſence of his *Coronell* he hath as abſolute command, and authoritie over the Regiment, as the *Coronell* hath himſelf.

In marching or imbattailling, if the Regiment conſiſts but of one deviſion, whenſoever the Coronell is in the head of his Regiment, he is to bring vp the *Reere* of that Regiment, but if there be two diviſions, then the *Coronel* leads the firſt, and the *Lieutenant Coronell* the ſecond, but when his *Coronell* ſhal be in the *Reere*, marching from an Ennemie, then it is his place to be in the head.

If the Regiment conſiſts of two *Battaillions*, his deviſion is to quarter and lodge on the left hand of his *Coronels*, and himſelf in the *Reere* of his owne Companie.

Of a Coronell.

A *Coronell* hath a very honorable Command, and is called in Spanish and French *Maſtro del Campo*, or in French *Maiſtre de Camp*, that is one of the maſters of the Feild, and therefore ought to be a man of Authoritie, and reſpect, having abſolute Commaund over the Captaines and Officers of his Regiment, and all ſuch are to reſpect his Commaunds, and obey him, as fully as they would doe the chiefeſt Commanders, & ought to love and honour him, which his valour, wiſedome, and direction will acquire him.

Alſo he ſhall ſee that all orders, Commandements and directions, which are delivered him by the publick Officers of the Armie for guards, marches, quartering, or any thing elſe, for matter of Juſtice, or for ordering of the troupes and furtherance of the ſervice, be duely executed, and performed within his owne Troupes. Further, if he himſelf doe finde any mutinie, or any diſcontented humours tending to mutinie, extreme outrage, or diſorder, or ſhall by any of his *Captaines*, Officers, or Souldiers be informed of any ſuch thing, he ſhall forthwith advertize the *Generall*, or Lord Marſhall of the Feild. And if he finde any other fault, negligence, or ſwarving from either the directions, or the policie of the Armie ſet downe, he ſhall ſtraightwaies acquaint them by whom ſuch direction did, or was to come vnto him, or ſome other ſuperiour Officer, if he cannot conveniently acquaint him with it, and ſhall produce the party ſo offending, with the witneſſes and proofs that order may be given forthwith, and juſtice done. And if he faile to give this information of any thing he knowes, or heares of, he ſhal be thought deepely faultie, or if any ſuch things paſſe without his knowledge, he ſhal be thought of worſe government then befits a man of his place and charge.

Vpon marches the *Coronell* ſhal be at the end of his troupes, that is, neereſt the Ennemie in the head of his Regiment going towards an Ennemie, and in the *Reerward* comming from one, and he ſhall not goe from thence, except it be for the ordering of his troupes, or ſome extraordinary occaſion to attend the *Generall* or the chiefe Officers of the Feild.
Alſo he is to ſee and commaund that his Regiment be well armed and exerciſed.

A *Coronell* being one of the chiefe Officers of the Feild, ought to be called to take Councill and advice with the *Generall*, eſpecially, vpon any peece of ſervice or in the day of Battle, which concernes his charge, where he may freely with others ſpeake his opinion of matters of weight, and importance. And though his opinion may be good, yet if the moſt voices be of the Contrarie opinion, and that things in the execution thereof ſhould fall out ill, howſoever, he ought to give way and ſubſcribe vnto the plurality of voices, and wholly

wholly obeying his *Generall*, be ready to execute all his Commaunds, giving thereby to vnderſtand, that the contrarie opinion, which he held in the Councill of warre, was neither for want of Courage nor affection.

A *Coronell* ought alſo to give all reſpect, love and obedience to the *Generall* of the Armie, the Lord Marshall and the *Sariant Maiour Generall* of the Feild, as having charge from the *Generall* to give out orders, to quarter and appoint allarme places, the place of Battaile, for marching, chooſing of guards, and ſending out convoies. Alſo once every weeke the *Coronell* may call together all his Captaines and ſhall enquire of all Offences hapned in his Regiment, and examine duely the nature and quality of ſuch Offences; and to prepare the cauſes for a more ſhort and eaſie hearing in a Marshals Court, for all *Coronels* are to repaire to a Court of warre as often as they ſhal be warned, as an aſſiſtent to the Lord marshall or preſident of the Council of warre in all cauſes, that ſhalbe queſtioned there, belonging to the iuſtice of the Armie.

Finally, in quartering or lodging, if his Regiment conſiſts of two diviſions, he ſhall quarter in the diviſion that is betweene his two battaillions aſſigned for his Regiment, becauſe ſo hee may beſt give directions to the whole, but wee ſhall ſhew this more particularly, when wee come to draw out the Quarter for a *Coronell* of his Regiment.

Of the Sariant Maiour Generall of an Armie.

THe Office of the *Sariant Maiour* of an Armie, is a place of a high degree, whoſe Commaund, is full of action, and therefore ought to be an able, a wiſe, a grave, and a valiant perſonage, experienced in the way of his profeſſion.

He is to come to the *Lord Generall* or *Lord Marshall* for directions for all watches, and guards, that are to be placed: and vpon the change of a Quarter, or a remove, he is to march with the *Generall*, or the *Lord Marshall* in the *Vantguard* (after he hath ſeene the Troupes ſetled in the order of their march) and to view the places appointed him by the *Generall*, or *Marshall* for the placing of the guards vpon the very firſt arrivall of the Troupes.

Having received the *Word*, and his *Orders* from the *Lord Generall* or the *Marshall*, he delivers it to the three *Sariant Maiours* of the *Tercias*, called alſo the three *Corporals of the Feild*, and they give both the *Word*, and orders to the *Sariant Maiours* of every Regiment.

Hee himſelfe in the beginning of the night, after the warning peece is gone of, and that all *Guards* are ſetled, he is to viſite them, and gives order to the three *Sariant Maiours*, or grand Corporals of the *Feild*, that attends vpon the *Vantguard*, *Battle*, and *Reereguard*, at what time they (or ſome chiefe Officers of the *Feild*) ſhall goe the *Graund Round*; and if he, or they finde any thing amiſſe, or any thing extraordinary diſcovered, either when he goeth himſelf, the other three *Sariant Maiours* of the *Tercias*, or any other chiefe *Officer*, they are to giue an account to him, and he to adviſe the *Lord Generall* or *Marshall* with it.

In a day of *Battell*, or any kind of fight, he is to come to the Lo. *Generall* or the *Marshal* for directions, and to ſee thoſe directions executed.

In a day of Battell alſo, he hath the ordering, and diſpoſing of the diviſions and *Battalions*, according to that forme, which the Generall Commaunds, and vpon all occaſions is actiue and ſtirring vp and downe, to ſpie out all advantages, which may offend an Enemie, and wiſely to foreſee all diſadvantages, which might annoy, or bring the Troupes into any diſorder.

Alſo he is the firſt chiefe Officer, which is to be at the *Rendevous* for the receiving, and diſpoſing of the troupes of horſe and foote, as alſo in giving order to provide them with Ammunition and Victuals.

And being arrived firſt at the *Rendevous*, he is to give the *Lord* Generall and the *Lord* Marshall, to vnderſtand the ſtate of the Armie, that the *Lord* Generall, may thereupon give him commaund, and direction, how, and in what manner, the Army is to be ordered,

and afterward gives order to the Sariant Maiours of the *Tercias*, and they to the Sariant Maiours of the Regiments, for the providing of Ammunition, Victuals, and all things neceſſarie for the ordering of the march.

He ought to be well acquainted with thoſe paſſages, and wayes through which the Armie is to March, and Commonly Marches in the head of the *Vantgard*, hauing ſome light horſe and firelocks to attend him, and to ſend out ſome troupes, to diſcover the waies, and paſſages, for the preventing of *Ambushments*, hauing the Captaines of the Pionniers to wayte vpon him and the *Quartermaſter Generall*, for the makeing and explayning of waies for the Armie, that they may not be ſurprized on a ſuddaine. And drawing neere vnto the Place of Quartering, or encamping, he, and the *Quartermaſter Generall*, riding before do view, & chooſe out ſuch ground and villages, as may be moſt commodious for the lodging, and Quartering of the Armie.

To Conclude, he is to haue abſolute Commaund ouer the three *Sariant maiours*, or Corporals of the feild, who are to be his *aſſiſtants* and his mouth, as he is the mouth of the Lord *Generall* or *Marshall* and therefore hath a vigilent eye ouer all things, and ſees that the Generals Commaunds deliuered to him, be ſtrictly kept, and obſerued.

The Office of the three Sariant Maiours of a Brigade, or Tercia, otherwiſe called Three Corporals of the feild.

THe States Armie by order from his higneſſe, the *Prince of Orange* is Commonly vpon a march diuided into three *Brigades*, or *Tercias*. Ouer each Tercia their is a Sariant Maiour of the feild, and in our Armie three, namely Sir *Iacob Ashly* Lieutenant Coronell ouer the English, *Monſieur Buat* Lieutenant Coronell ouer the *French*, and Sir *David Balford* Coronell ouer the *Scotch*. In French he is called *Le Mareſchal*, or *Le Sariant Maiour de Battaille*, and in English one of *the Great Corporals of the Feild*. A Sariant Maiour then of a *Tercia* doth receiue his order, either from the Lord General himſelf, or the Lord Marshall, but moſt commonly from the *Sariant Maiour* Gen. aboue mentioned. In what forme the *Tercia* is to be ordered, and march, with what Regiments of foot, horſe, Ordinance and Baggage, Hee aſſignes and shewes them the Place, where they are to draw out in Battaille, and from the Sariant maiour Generall, whether they are to march in the *Vantgard*, the *Battell*, or the *Reeregard*, ſo that in marching euery one of theſe three shall attend vpon his *Brigade*, and ſeuerall diuiſions, and in the abſence of the Sariant Maiour Generall, ſee that the order of Marching, or Imbattailing be duely obſerved. And ſo euery one of theſe three Sariant Maiours of the feild ſo aſſigned, shall be at the Commandment of him that Commaunds that *Brigade*, or *Tercia*, to be ſent to the Lord *Generall*, *Marshall*, or Sariant Maiour Generall, vpon any occaſion that belongs to the ſervice.

Theſe three Sariant Maiours of *Tercias*, are to be lodged as neere the Sariant Maiour Generall, as conueniently may bee. And theſe three which attends vpon the *Vantgard*, the *Battel*, and the *Reereguard*, shall with the *Sariant maiour Generall* make choiſe of ground for the placing of the guards, which they aſſigne vnto the *Sariant Maiours* of the Regiments, and shall goe the Round, and viſite the guards commonly euery night, and at ſuch an houre, as the *Sariant Maiour* Generall appoints them, and as often, either by night, or by day as he shall direct them.

If any of theſe three *Sariant Maiours* of the Feild shall finde any want of powder, munition, or Victuals in the *Vantgard*; *Battell*, or *Reeregard*, either in march, when the troupes are lodged, or quartered, or during any fight : He doth advertize the *Sariant Maiour* Generall of the Armie, with the ſaid wants, and then by his direction, shall goe with an Officer of euery Regiment of that *Tercia*, to the Maſter of the Ordinance, the Lieutenant of the Ordinance, or to the Commiſſarie Generall of the Munition or victuals.

To conclude, he receiuing the *Word* and orders from the Lord Generall or *Sariant Maiour* Generall of the Army, giues it to the *Sariant Maiours* of the Regiments, but becauſe ſometimes, when the *Word* is to be ſent to all the Quarters, the *Sariant Maiour* of

euery

euery Regiment cannot conveniently come to the *Sariant Maiour General* of the Army for it. The *Sariant Maiours* of the *Tercias* do attend vpon the *Sariant Maiour* of the Armie euery morning, and euening to receiue orders, and to carry the *Word* vnto the ſeverall Quarters, where the *Sariant Maiours* of euerie Regiments comes vnto him for it.

Of the Maſter (or Generall) of the Ordinance.

HEe hath the charge of all the Artillerie, Armes, Munitions, Engines, Matterials and Inſtruments for worke, yea of al things that belongs to the Ordinance, as Bedds, Carriages, and all things that appertaines to the Office of Maſter of the Ordinance.

Vnder the Generall of the Armie, he hath abſolute Commaund, over all Officers belonging to the traine of Ordinance, as the Lieutenant of the Ordinance, the Controuler, the Clarke, the Gentlemen of the Ordinance, the maſter Gunners, Armores, munitions, Inginiers, Captaines, of Pyoniers, and Mineurs, ouer all Smithes, Carpenters, and Wheelewrights, And over all Artificers, and Attendants vpon the traine of the Artillerie, Munitions and Matterials.

The Maſter, or Generall of the Ordinance (after the places for Batteries are choſen, & aſſigned him by the Generall of the Armie,) he is to obſerue, Command, and direct the making of Gabions, Bedds, aud platformes for the Ordinance, and to giue direction for the making of waies and Explanadoes, for the bringing of the Ordinance vp to the batteries, to ſee that the Batteries be made Canon proofe, and the portholes ſo, that the Ordinance may moſt annoy an Ennemy.

And after he is once commanded by the Generall to begin a battery, he is to giue directiõ to his inferiour officers, to play and beate with the Ordinance vpon ſuch and ſuch places, till the Generall giues order to the contrarie, and as occaſion and ground is gained to advance and remove the ordinance to neerer places. Alſo in a day of battell or fight, he is to chooſe the moſt advantagious places, for the planting of Ordinance, where they may gaule and offend an Enemie moſt, having a Vigilant eye that all things be done in good order.

All the Ordinance and Carriages belonging to the traine of his Office, are vpon a march, in the ſafeſt place, and are to take place before all the other Carriages of the Army, unleſſe ſome of the Ordinance be drawne to march in the *Vantguard, Battell, or Reere*, or to ſome other places, where the neceſſity of ſeruice may require.

He is to make orders and Lawes for the well-governing of his Inferiour Officers and all Artiſans appertayning to his Office, with which he is to make the Generall acquainted, that he from time to time, may know the State of the Ordinance and all things belonging thereunto, and take care that the ſervice of the Land be in no wiſe defrauded.

The reſt of the Officers vnder his command, and the dependances thereof shal be handled more particularly in a treatiſe apart.

Of the Commis of the Ammunition and Matterials.

THe *Commis of the Munition and Matterials*, is vnder the traine of the *Maſter of the Ordinance*, he by order from the *Generall, or the Sariant Maiour Generall*, gives out al Munition, as *Powder, Bullets, and Match*, to the Regiments, and Companies, according to the proportion Commanded by the Generall: and as he receiues his Liſt and Billett from the Sariant Maiour Generall of the Army, for which orders being giuen out, the Sariants of euery Companie repaires to his Lodging, or quarter, to receiue it and giues an acquittance vnder their hand for the receit of it. Likewiſe what powder, *Bullets or Match* are ſpent and shott away in the Approaches or Trenches, The Colonell which Commands there, giues him his hand, how much powder, how many firkins of Bullets, and how much match was ſpent and shott away that night, and the day following, becauſe he is to giue vp an

account vnto the States, and Generall how it was beſtowed.

Moreover, for entrenching, outworkes, and Approches, he is to deliuer to the Quartermaſter of euery Regiment, as many Matterials: to witt, ſpades, showels, Axes, pickaxes, hachets and bils, as there are workemen Commaunded out of euery Regiment, and Company, to go to worke, which matterials the Quartermaſter is to paſſe his hand for, and to diſtribute them to the Companies, and when the worke is ended, to deliver them vp againe, or to giue him a Reckoning, how many are broken, or loſt vpon ſervice, that the Commis may render vp an account of them to the States.

Of the Lord Marshall of the Feild.

THe *Lord Marshall* of the Feild, is in Commaund, and authority next vnto the *Generall*, and is (as it were) his Lieutenant, and Mouth, and therefore being in ſo eminent a place, ought to be acquainted with the duties of the other Officers of the Feild, eſpecially, with the Generals Office it ſelf, becauſe there is ſuch an affinity betwixt them, as hauing abſolute power to commaund the Armie in the Generals abſence, and oftentimes he may be emploied to Commaund an Armie himſelf, as Commonly the Lord Marshals of France doe.

His chiefe Office is, to ſee that Iuſtice be duely adminiſtred, and that the lawes, Articles, and Ordinances of Marshall diſcipline, be ſtricktly kept and obſerved, that all banishments, and Proclamations comming either from the Generall, or Councill of warre be published and executed, and by his Authority to cauſe Malefactours, and offenders to be punished as an example to others. And ſeing that all he doth, is for the Generall good of the whole Armie, he ought to be honored, and reſpected of all men and in no wiſe Contradicted: It is his proper charge, to take care, that the policy and diſcipline of the Armie, and the orders eſtablished by the Generall, be exactly kept and obſerved vnder his authority.

All quarrels, and Duels, hapning betweene Officer and Officer, between Souldier and Souldier, either, Horſe or Foote, ought to come before him, being his Office to right the wronged, to punish the Offendour, and by his wiſedome, and authority to appeaſe and compoſe them.

The Lord Marshall when the *Vantgard* is drawne out, and ranged in Battaille, while the Battell, and the Reere are a diſlodging, he ſees that both Horſe, and Foote march orderly and in their owne place.

And with ſome choiſe Troupes marches before the *Vantgard*, and Conſiders the waies and paſſages, as valleys, Rivers, Marras, Bogs, mountaines, hils, hedges, woods, hollow, and Narrow waies, through which the Armie is to paſſe, that he may order the march accordingly, as alſo to ſend out Scouts, Guides and Eſpies, to diſcover and get intelligence from an Enemie.

He alſo marches before the head of the Armie, ſometimes with the *Sariant Maiour* Generall, the Quartermaſter Generall, and the Quartermaſters of every Regiment experienced men, to view and make choiſe of the ground, where the Armie is to be lodged and Quartered. He obſerves alſo the marching, Quartering, and order of fighting, three chiefe things belonging to an Armie, and ſees and Commaunds, that the march, Quartering and fight be conformable to that order, which the Generall hath preſcribed. And the Diviſions and Troupes ranged in Battaille: he is full of action, and conſiders the place and ſoile of the ground, the advantages of the Sunne, and winde, and how the Troupes with moſt advantage may be brought to encounter an Enemy, taking care that the order commanded by the Generall be not changed, and in fight he ſees that they be duely ſeconded, and relieved, and being ouerlayd or charged, to cauſe them to retreate orderly, for the auoiding of confuſion, hauing a vigilant eye vpon all caſualties, which may happen. For, what the Generall ordaines, the Lord Marshall ſees performed and executed, to the end, that both their deſires may take one effect. For when Commaunders vndertakes a warre, and fight with Councill

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and Iudgement, and ſees all things executed with wiſdome, diſcretion, and valour, giving the ſucceſſe to God, no man can be blamed.

The Lord Marshall alſo ought to be acquainted with the Generals deſſigne, and whether hee is reſolued to fight with an Enemy or no; to conſider whether hee is to charge an Enemy in the Front, in the Reere, or on the Flanckes, to hinder them from Quartering, and to ſend out Convoies for the cutting off of his Victuals and proviſions.

He ought to conſider likewiſe, how an Enemie lies encamped, which way be can come beſt to attempt him, which way he marches, and whether his deſſigne tends, what order he keepes, with what Troupes he may hinder or annoy an Enemie, or being once engaged in fight, how he may beſt ſecond, and relieue his owne men, either with Horſe, or foote, to place and bring up the diuiſions of Muskettiers, where they may moſt offend and gaule an Enemie, and how the bodies of pikes may with the moſt advantage bee brought to the charge and ſhock.

As alſo to underſtand of what ſtrength in horſe and foote the Enemie is, what Baggage and Carriage and incumbrances he hath, and whence his Victuals are to come, to know whether an Enemy is to ioyne with an other, and how, and in what maner he may beſt break that Coniunction.

Hee is to haue by him alſo, an exact *Mapp* of that Countrie, and a diſcription of all the waies, and paſſages through which the Armie is to paſſe, having alſo good *Guides*, wel acquainted with the ſeverall paſſages of that Countrie and place.

The *Lord Marshall* likewiſe, with the Sariant *Maiour Generall* of the Armie, appoints all places for *Watches and Guardes*, either of Horſe, or Foot, which he aſſignes to the Sariant Maiours of the *Tercias*, and they to the Sariant Maiours of the *Regiments*, the places, which they are to maintaine, and make good. Alſo the *Alarme Places*, and makes choiſe of the ground to fight a Battell in, for the better ſafety and defence of the Armie.

In the day of Battell he is full of Action, continually in motion, ſtirring vp and downe to giue directions where need requires, to encourage the Souldiers, and Officers, and to find out all advantages, where they may moſt offend an Enemy.

Vpon a March, or being encamped, he ought to countenance, and favour Marchants, Victuallers and others, which furniſhes, and brings proviſions vnto the Armie, and giues Commaund, that they be not abuſed, and wronged, but may ſell their proviſions and Commodities peaceably. As alſo he giues order by his authority to the *Provoſt Marshall Generall*, and to the *Marshals* of everie Regiment, to ſett reaſonable rates, and prices vpon Victuals and Beere for the good of the ſouldiers.

There are divers other points appertaining to the Office of the *Lord Marshall*, but for brevity ſake, I will now Omitt them.

THE OFFICE OF THE LORD (OR *Captaine) Generall of an Armie.*

A *Generall* hath absolute Commaund ouer the whole Army, and is to know, and to vnderstand well, the charges and duties of euerie Inferiour Officer vnder his Commaund, and ought to be a personage of great experience, wisdome, and discretion, that he may be capable to discerne, and chuse the best of different opinions, which often fals out in Councils of warre.

Yea, to be a personage discended of some noble house and famillie, which will giue a lustre vnto his Commaund, a man of an vndaunted Courage & authoritie, seuere and austere in his Commaund, who ought to be greatly honored, feared, and respected, a man full of resolution, and magnanimity in the daie of Battell, and constant andresolute in desperate cases, happie in his dessignes and enterprises, and aboue all religious, invocating God to be propitious vnto him, and to giue a blessing vpon his dessignes, to giue him knowledge, policie and vnderstanding, how to order and Gouerne his Armie well, that he may keepe it vnder good discipline, and to make it not onely capable of vanquishing, but also Victorious, which depends onely vpon the Almighty power of the Lord of Hoasts, and that neither good, nor bad succesſe should make him change, or alter his Countenance, but vpon the hottest services, to giue out his orders and directions with temperance and modiration without impatience, Choller, cruelty, or emulation, against those that vnder his Commaud, haue gained honour and deserued well, which, he ought rather to advance and reward them, and this will make him to be honored, loved, and respected of all men.

A *Generall* then ought to be qualified with these excellent vertues, namely, *wisedome, Valour, Experience, Providence, Constancie, Authority*, and *Liberalitie*, and should ponder, and Consider well, the occasion, which may engage him in a fight, or moue him to giue battell to an Enemie, to be sparing, and a good *Menagier*, of the lives of his men, and not rashly and unadvisedly to hazard his Troupes, for he may vanquish, aswell by *Policie* (in foreseeing all advantages and disadvantages) as by *force*, by pulling on the *Foxses* skin, aswell as the *Lyons*, as by surprising an Enemy vnawares, by laying hold vpon an advantage, when their Troupes are in disorder, when they are dispersed, when they are dishartened, harryed, and wearied out, when they are pinched with hunger, thirst, and cold, and such like casualities, and accidents which may befall them.

Moreouer, in seeking to diuert, amuze, and divide their Armie, while he keepes his owne in peace, concord, and vnity, which is one of the Principle points of warre. To gaine time, and advantagious places, and to prevent, and hinder an Enemie from possessing them, to seeke by all meanes to divert, and breake an Enemies dessigne, and to put his owne into execution with expedition, and to premeditate and ouerweigh a thousand things, which depends vpon the warre, having a vigilant eye vpon all accidents that may happen, for the Art military hath many difficulties attending vpon it, and one is not able to expresse the many hazards, straights, and differences which may fall out in this profession.

Hee ought not lightly to hazard his men vpon skirmishes, or in a Battell, (vnlesse he be forced to it) but vpon very good grounds, and advantages, for having flesht his men in small occasions, it hartens and enbouldens his souldiers, and giues them the more encouragment: and assurance of good succesſe in greater for they perceiuing the valiant, wise, and able Carriage and Conduct of their Leaders, & Commaundours, especially of their Generall, this makes them fight brauely, and gives them a hope of Victory.

A Generall also ought to take the graue sage Councill and wise advice, of his chiefes, and Commandours, and (as is sayd) to make choise of the best, and yet not to make knowne his owne resolution; for many a brave attempt and enterprize hath bin broken for want of *Secrecie*, and if he should reueale it to some intimate friends, yet to doe it very sparingly and reseruedly, by which meanes of *secrecie*, he shall gaine knowledge, and experience, and in an instant will be ready to lay hold vpon such & such occasions, as may execute his Resolution,

and

and thereby make him capable of preuailing.

A Generall ought to take care, that his Armie be not wearied out, and fatigated ouermuch, which breedes ſickneſſes, and cauſes the weakning thereof, to ſee & Command that the Regiments be well armed, and duely exerciſed, in all the ſeuerall motions of warre, that Iuſtice be readily executed, to be fauourable to good men, and ſeuere againſt euill doers and Offendours. It is alſo the Offiice of a Generall to giue Charge, that the Armie be prouided with Victuals, amunitions, and other things belonging to the warre.

A *Generall* ought to ſpeake diuerſe languages, for hauing to doe with ſundrie Nations vnder his Command, being able to ſpeake vnto them in their owne language, this giues great deale of Contentment.

Moreouer, he ought to be learned, a good *Mathematician*, and well ſeene in the points of *Fortification*, and to haue excellent Inginiers about him, that are carefull in running the lines of Approches for the preſeruation of the liues of men.

It is requiſite alſo, that he ſhould haue good *Guides*, and ſpies about him, to get him intelligence of the State of an Enemie, and ought to ſpare no money that way, for the breaking of an Enemies deſſigne, and the aduancement of his owne.

A braue Generall alſo conſiders, that the force of an Armie conſiſts not in the multitude of men, but in Valliant and well experienced ſouldiers, and Officers, which are well inſtucted, and trained vp in the vſe of their armes; and knowes thar Victorie conſiſts not in many Troupes but that an Enemy may be more ſtronger then his as oftentimes hath hapned but in obſeruing of good order, and dicipline chooſing of aduantages of wind; Sunne, and ground, together with the ready obedience of his men, in executing of his Commaunds, for by experience in their profeſſion, they become more bould and confident in fight, ſo that an old beaten ſouldier, knowes it by heart, what his Chiefe and Generall requires of him

As a Generall should be beloued: ſo likewiſe he ought to be feared and of the two among Common ſouldiers rather to be feared; for the moſt part of them, are rather reſtrayned from doing euill, for feare of punishment, then for any loue they beare to their Generall.

To conclude, he ought to be experienced in the beleegring of Townes, and Forts, to view all places of advantages, and where an Enemy may moſt offend him, to fortifie his Campe ſtrongly with lines of *Circumvalation*, *Forts* and workes vpon it, to know the ſite, and ſituation of a towne, how, and in what manner thoſe within are able to defend it with men and munition, to cauſe his Inginiers to be very circumſpect, and Carefull how they run their lines. to ſap forward to the weakeſt part of that Towne, or fort which he intends to become Maſter of, with diverſe other things requiſite in a brave Generall, which for brevities ſake I will omit.

NOW FOLLOWES IN WHAT ORDER *an Army ought to march in over a Campaigne, narrow passages, Woods and Rivers.*

HAving shewne the severall Offices of the Officers of the field, it resteth now to speak something in what order an Armie ought to march.

The Armie then being come to the *Rendevous*, or being to disencampe from any place, the afternoone, or evening before the breakeing vp of it, orders is giuen out, that the Souldiers shal be provided with Munition, and so many dayes Victuals, as the Generall shal Command.

But an Enemy being neere at hand, when the Generall will conceale the breakeing vp, they draw into Armes silently, without sounding of Drum, or Trumpet.

The Generall being attended vpon before his Lodging, by the Sariant *Maiour Generall*, *the Quarter master Generall*, *the Captaine of the Pionniers* and some other Officers.

The most part of the Armie, being drawne into Armes, the Generall giues Command to the cheife *Inginier Quartermaster* or some other, to throw downe the Trench, fill vp the Ditch, and to make such Gappes in it, that whole devisions, and Battaillions may march through them.

After the Trench is cast downe, the *Generall, or the Sariant Maiour Generall* from him, gives order that the *Avantguard* shall draw forth, and march a good distance without, and there to stand, and make a halt, till the *Battell* and the *Reere*, be also drawne out, in obseruing a convenient distance betweene them, In the interim the Ordinance, Carriages, waggons, and baggage that belongs to the Armie; are likewise drawne out, and put into order. And the Guides, Scouts and Pyonniers sent out before into the Countrie, to discouver and to set out Centinels of Horse vpon all passages, and heigths, while the Armie is a marching forwards.

The Master of the *Ordinance* being present, Commaundeth where the Ordinance and the traine of Carriages belonging to them shall march. And giveth order to the Conductours, and Inferiour Officers, to march forward, as the nature and propriety of the waies will permit. And if there be any rough waies, which are to be explained, he Ordaines the Captaine of the Pioniers, and his men to make them plaine and even, likewise all the waggons of Amunition, & Victuals with the baggage, are put in order by the Carriage Master, and conductours of the traine: but the waggons and Cars belonging to the Horse, they are ordered by their Officers, to march according to the *seignority* of everie Regiment.

How the Artillerie and the Carriages are to March.

The Ordinance marches first with all the Carriages, and the Pyonniers are alwaies by them, having noe other waggons mingled among them, and so march in their order onely with one waggon before them, laden with spades, shovels, Axses, hachets, and biles, and other instruments to make the wayes, and explaine the ground and ditches, after which is drawne an Instrument, which doth make a *rut* vpon the waye, to show which way the Canon is to passe. The lesser lighter peeces of Ordinance layd vpon their Carriages, followes the said Instrument, and afterward the great peeces drawne vpon block-waggons, when there is no danger: but expecting to be encountred by an Enemie, they draw them upon their Carriages for feare of loosing time in mounting them, while an Enemie might fall vpon some part of the Armie. Next after the Ordinance followes the waggons with Instruments, and tooles for Carpenters, and Smiths, the waggons laden with Bullets, powder, and match, and after them waggons with Pikes, and muskets all which being passed; then followes the waggons belonging to the Generall of the Ordinance and his Inferiour Officers. And after them all the waggons laden with munition for the Ordinance, and the Armie, the waggons laden with Victuals and provisions, and waggons for the sick and hurt, and last of all the baggage, belonging to the Officers of the whole Armie.

But when necessitie requires, some Feild peeces marches before in the head of the Armie, when

when and Enemie is expected to fall on, with which there marches ſome waggons laden with powder, match, and Bullets to be vſed vpon any occaſion.

All the Ordinance, carriages, and baggage being thus ordered, and the armie devided into the *Vantguard*, the *Battell* and the *Reere*: the *Sariant Maiours* of the foote Regiments, and the Commiſſaries of the Horſe Troupes, having received order, which way they are to leade the Troupes, that they may give noe hindrance one to an other, the *Generall*, or the *Sariant Maiour Generall* gives Command, that the *Vantguard* ſhall begin to march, and ſends out before Guides and light horſemen, to diſcouver the paſſages: yet ſo, that they ride not ſo farre afore; but that they keepe alwaies within ſight of the *Vantguard*, that vpon any diſcouverie of an Enemie, they may advertize and give them warning of it in time.

The *Vantguard* then (as is ſayd) hath Commonly ſome ſmall peeces of Ordinance marching before it, which likewiſe may happen before the *Battell*, and in the *Reere* of all, and a greater number of horſe, and foote, as the neceſſitie may require, ſo that the three *Tercias* of the Armie, are all of them provided with Ordinance, where it is thought moſt needefull, and where it is imagined an Enemie may give an attempt, either vpon the *Front*, the *Reere*, or vpon either of the *Flankes*: for which one can give noe certaine rule, but muſt defend themſelves in that place, where the occaſion preſenteth it ſelfe.

When the *Campagnie* Heath or Feild, is ſpacious and large, then one may march in full Battaile by diviſions, and cloſe by an other in good order, which an Enemy perceiving, it may be he dares not offer battell otherwiſe every diviſion, and *Battaillion*, may march by it ſelfe with more eaſe and liberty, then when they are ioyned cloſe together: yet ſo that in caſe of neceſſity they may eaſely be drawne together, as likewiſe the Ordinance, and baggage drawne to that place, where they may be ſafeſt, and beſt defended by the troupes, if an Enemy ſhould giue an attempt vpon them.

The waggons ought to be drawne vp, and ranged into eight, or ten rancks cloſe one to an other, that they may march without hindring one an other. and the Ordinance may march vpon one of the flankes of the Armie, and ſome Feild peeces before if neceſſity ſhould require, without hindring, or putting the reſt of the waggons into diſorder, which the Maſter of the Ordinance, or the Carriage Maſter, ought to Conſider well, and take a ſpeciall care of.

The Chiefe Officer, which Commaundeth the *Reereguard*, gives order that ſome Troups of light horſemen, ſhall march with in ſight of the whole *Reere*, eſpecially, when they are to paſſe over a Heath, or *Campagnie*: but the Countrie having mountaines, hils and vallies in yt, then the horſe may be commaunded to march ſometimes in the *Vantguard*, and ſometimes in the *Reere* of all the Armie, and keepe watch, and centinels vpon the higheſt places, that an Enemy may not diſcouver the ſtrength of the Armie, or in what order it marches.

When the armie is to march through ſome narrow paſſages, the *Vantguard* is commonly ſtrengthened with ſome foote, or Ordinance drawne vp before it, leſt an Enemie might ſurprize it, & marches then by files, and drawes vp as the condition of the place will permit. In like manner the *Reereguard* in places of danger, ought to be ſtrengthned, as alſo the *Battell* ranged into ſuch an order, that the Ordinance, and Baggage, being placed in the middeſt, may come beſt to ſerve, and relieve the other Troups, from whence they may ſend Harquebuſſiers (as occaſion ſerves) to attend both vpon the *Vantguard*, and the *Reere*, and as the ground will beſt afford.

In caſe that the waies and paſſages be ſo narrow, that the Ordinance, Carriages, and baggage takes vp ſo Much time, that the *Vantguard* cannot be eaſely ſeconded by the *Reereguard*, then there may be appointed ſome Troupes of *Reſerve*, which may march along with the Carriages, and Baggage, and be diſpoſed of in ſuch a ſort, that they may the better relieve thoſe Troupes which ſhould be overcharged by an Enemy.

Vpon ſuch an occaſion, one ought to conſider and obſerve well, the nature, and condition of that paſſage, through which the Armie is to march, whether there be any windings, and turnings in it, or other intricate waies, as through woods, hils and, vallies, where an Enemy may beſt lay his *Ambuſcadoes*: therefore vpon every ſuch turning, or croſſe way,

a troupe of horſe and ſome foote ought to be placed vpon it, to guard there, till the Ordinance, Carriage, and Baggage be paſt and out of danger.

How one is to march through a wood.

But in paſſing through a Forreſt, a great wood, or a Grove, there ought to be placed good ſtore of Horſe, vpon the waies that goes into it, and where the Armie is to paſſe, and to round and guard it well, aſwell on the one ſide, as on the other. And if there be any plaine, or open places in it, the Horſe are to overſpread it, and to draw there in Battaille for the ſecuring of the paſſage, till the Ordinance and Baggage be all paſt, and that the foote, and Horſe follow, which are appointed as a Reſerve to bring vp the Reere.

The Armie then, having paſſed through a wood, and come againe into a plaine *Campagnie* or Feild, ſome Horſe are to guard the way that comes out of the wood, till the Horſe troupes are drawn vp in thoſe Feilds, and are poſſeſſed of the heigths thereof.

How, and in what manner an Armie is to paſſe over a River.

When an Armie is to march through a Countrie, wherein there are Rivers and Brookes; The States Armie carries continually along with them ſome ten or twelve boates, having plancks Sparrs, Beames, anckors and Cables laden in them, and vpon thoſe *Block-waggons* that are drawne with ſome ten, or twelve couple of horſe, which comming to a river they preſently take them downe, caſts out their anckors, and laies them over the river, as broad as it is, & as many as they have vſe of, ioyning them together, laying the beames, plancks, ſparrs, & boards vpon them, and ſo in an inſtant, claps ouer a bridge, over which the Armie, Ordinance and Carriages may paſſe without danger. Sometimes alſo for expedition ſake, they lay over bundles of floate or flag bridges bound vp in Canvaſs, as alſo they make a bridge with Barrels, Hogsheads, in laying ſpars and planckes vpon them, being claſped and faſtned hard together: ſo that foote & horſe, and ſome ſmall Feild peeces may march over them.

A Bridge then (having good Inginiers, Carpenters, and workemen) is preſently made over a River, or a brook, for the ſecuring whereof there are certaine peeces of Ordinance, drawne vp, and planted by the river ſide, to play vpon an Ennemie, if they ſhould oppoſe the paſſage over it, and likewiſe drawes vp ſome *Harquebuſſers*, lighthorſemen, firelocks, and muskettiers, to give fire vpon an Enemie, while the bridg is a making. As ſoone as the bridg is layd over, ſome firelocks, halfepikes, and horſe marches firſt over it, to maintaine and make good the other ſide of the river, till all the Armie and carriage be come over, and takes alſo a long with them foure or fiue ſmall peeces of Ordinance, to ſcoure the paſſage, a waggon laden with powder, and amunition, and ſome Pionniers to make the waies, hedges, & ditches plaine, & expecting an Enemie at hand, commonly caſt vp a trench or a worke on both ſides of the bridge, having ſome 500 Souldiers to guard it, till the Armie and all the Carriages and Baggage be paſſed ouer it.

Now if an Enemie ſhould ſeeke to oppoſe, and hinder your paſſage over it, the Ordinance, horſe, and firelookes above mentioned are placed purpoſely vpon the Rivers ſide to free the paſſage, and to cleare the Coaſt.

FIRST,

FIRST,
OF THE ORDERING, AND FORMING
of a Deviſion, or a Battalion, and then the forme of an Army of thirty thouſand Horſe, and Foote raunged in Battell.

THe ordering of a Regiment, according to his highneſſe the *Prince of Orange* his commād, hath bin showne already in the firſt part of this book, namely, that Companies being made into even files, and ten deepe, foure, or five Companies, ioyned together make a diviſion, to wit, the Pikes are drawne firſt into one bodie, and then the Muskettiers into an other, ſtanding in their true diſtance of there foote in file & Ranke, and 18 foote diſtance betweene the Pikes and the Muskettiers, this is the firſt order. The ſecond is, when th: Muskettiers are equally devided, as neere as may be, and drawne vp on the right, and left flankes of the pikes, there to giue fire by Rankes, or to march away, as theſe two firſt figures marked wth number 1 and 2 doe shew.

Now the fitteſt number of men to make a deviſion of, is accounted to be 500 Pikes, and Musketteires, that is, 25 files of Pikes, and 25 files of Musketteires, or more, or leſſe of the one or of the other, as they fall out.

This number being ſo embattailled makes an *Agile* bodie, and the beſt to be brought to fight, and two of them being ioyned neere one an other, can beſt ſecond, and releiue each other, better then your great *Phalanges*, which are unweeldy bodies, the experience whereof was ſeene in the Battell of *Nieuport*: for being once broken, and routed, they can hardly be reallyed againe, and cannot bring ſo many men to Fight, as the Leſſer Bodies doe.

Many of theſe Deviſions being drawne together make a *Tercia*, *or one of the third parts of an Armie*, and three of them the whole.

For all the Officers and Souldiers of an Army, are devided into three parts called *Brigadoes*, or *Tercias*, each of them having a ſeverall name, to witt, the *Vantguard*, *the Battel* & the *Reereguard*.

Now that Tercia, which is to march firſt, is called the *Vantguard*, that which marches in the midſt the *Battaile*, and that which comes vp laſt the *Reere*. Everie one of them vpon a march euery day takeing their turnes interchangeably: for the ſecond day of the march, the *Battaile* becomes the *Vantguard*, and the *Reere* the ſecond day hath the *Battaile*, and the third day the *Tercia* which had the *Reere* the firſt day is the *Vantguard*.

Moreover, each *Tercia* may likewiſe be ſubdivided into a *Vantguard* a *Battaile* & *a Reere*, to the end each of them with the more convenience may be orderly brought to fight, and by that *Cheife*, which commaunds them.

Therefore, the *Battaill* one of the *Tercias* of the Army, being placed in the midſt, that of the *Vantguard*, may be drawne on the right, and the Reere on the left flanke of the *Battaile*.

Now the number of the deviſions, which each of theſe *Tercias* haue, are ordered, and devided after this manner, two deuiſions before, two in the midſt, and two behind, ſtanding aboue, as you may ſee in ſome of the figures of the Battells following, having ſix or 7 deviſions placed in euerie *Tercia*. The ſeventh being vneven, is placed as a Reſerue behind the Reere, to ſecond the others in time of neede.

The firſt deviſions of the *Tercias* ſtanding in a right line, are to give the firſt *charge*, according to the order of their *March*.

The ſecond deviſions ſtanding likewiſe in a right line, makes likewiſe the ſecond troupes and the third part of the *Battaile*.

Now theſe deviſions are ſo ordered and ioyned, that if the firſt should be overcharged and come to giue ground, then the ſecond are to come vp, and to releiue the firſt, yet in ſuch a diſtance, as they may not hinder one an other in marching by them, but finde place to come vp betwixt the firſt.

The third deviſions are to be placed directly behind the ſecōd, in a diſtance twiſe as much

as the ſecond is from the firſt, that if it ſhould happen, that the firſt diviſion ſhould ſtand behind the ſecond, that then the third might have roome enough, to put it ſelf into good order.

The Horſe Troupes are commonly ordered, the one halfe on the right, the other halfe on the left flanke of the diviſions, and Battaillons of foote, as the firſt figure of an Armie demonſtrates.

And ſometimes there may be *Battaillions* of Horſe interlaced, and placed betwixt the *intervals*, and diſtances of the Foote, as the ground and neceſſity may require. For, if an Enemies Horſe ſhould be ranged betweene his *Battaillions* of foote, it is needefull then, that the other ſide ſhould obſerve the ſame forme likewiſe, and have horſe to encounter horſe, leaſt they ſhould breake in vpon the foote diviſions, and ſo by this meanes they may with the more convenience ſecond, and relieve one an other, otherwiſe the Foote being overlayd with an Enemies Horſe, having not Horſe at hand, to charge and ſecond them, might be eaſely routed and overthrowne, and though and Enemie have not placed Horſe betweene their *battailions* of foote, yet it may eaſely be done, according to the diſcretion and foreſight of the Generall. All which ſhalbe clearly demonſtrated to the Eye by figure firſt in beginning with an Army of ſix thouſand Horſe, and 24 thowſand foote embattailed into three Tercias, with their ſeuerall diviſions, and afterward I will show the grounds and platformes of the Battaile of *Nieuport in Flanders*, fought (Anno 1600) betweene *Prince Maurice* of famous memorie, *& Albert Arch Duke of Auſtria*, and then proceede on to repreſent vnto you the formes of Battailes shown by the Prince of *Orange* abouesaid, & his highneſſe brother the Prince of Orange that now is till Anno 1635, which may giue ſome ſatisfaction to thoſe, which are deſirous to follow the profeſſion of a Souldier.

The Demonſtration of the figures following, marked with great A. and B.

The two firſt figures, marked with the figure 1 and 1 are two Diviſions of 25 files of pikes a peece, and ten rankes deepe, ranged in Battaille.

The ſecond two figures noted 2. and 2. are two Diviſions of muskettiers, conſiſting alſo of 25 files a peece, and 10 Rankes deepe as aboveſaid.

Now if you are deſirous to alter this forme, and divide your Muskettiers into two parts, then you may draw vp 13 files on the right flanke, and 12 files on the left flanke of the Pikes, and giving them their true In tervals *and diſtances for the Muskettiers to fall away, then there are two diviſions made of a Regiment, and they ſtand as is shewed vnderneath, marked with the the figure 3.*

The figure B *repreſents the forme of an Armie embattailed, conſiſting of 24 Regiments of foote, each Regiment making two diviſions of 1000 men, and 20 diviſions of Horſe, Curaſſiers, and Harquebuſiers, each diviſion conſiſting of 300 Horſe, makeing ſix thouſand Horſe in all ranged into three Tercias, with the true number of feete, and diſtances betweene them, as the figures showes.*

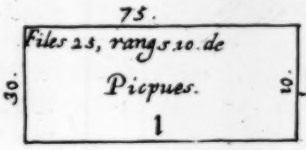
Note alſo, where the gentle Reader ſees a P marked within the Deviſion, that ſignifies Pikes, and the deviſion underneath are muskettеirs marked with the Letter M.

To conclude, the Horſe are noted in French with C for Cavallerie, and in English with H for Horſe.

The figures that are Coloured are diſtinguished thus. The Pikes with a yellow, the Musketeirs with a green, and the Horſe with a red colour.

Two divisions of 25 files of
Ranke & file

Deux divisions de 25 =

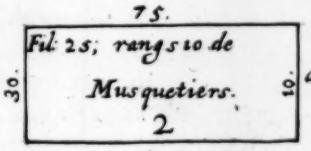


files

50

Two Devisions of 25 files of

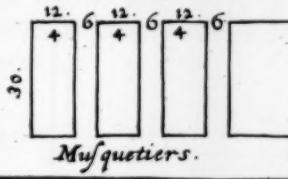
Deux divisions de 25 files



de Mus

Division de 500 Picques et M

A Devision of 500 Pikes et M



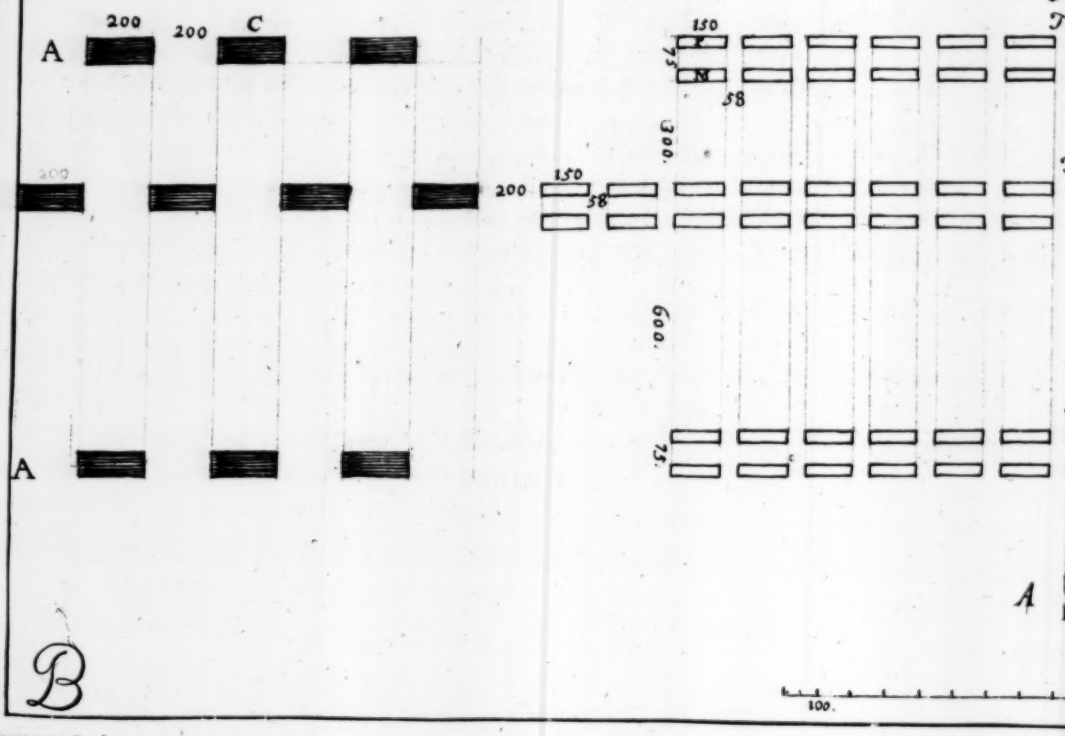
A

Ordre de Bataille de 24000 d'Infanterie, et 6000. de Cavaillerie, Ordonné e

The Forme of an Armie of 24 Thousand

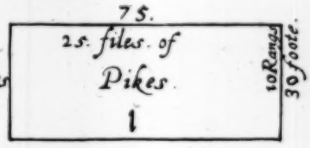
Brigades

The Front from



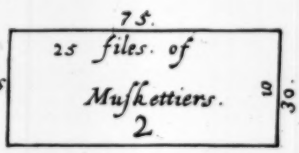
B

of Pikes standing in their order in file making 500 men.



les de Picques mis en Ordre.

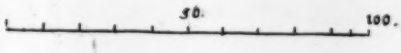
les of Muskettiers making 500 men.



Musquetaires faisant 500 hommes.

et Musquetiers en Bataille.

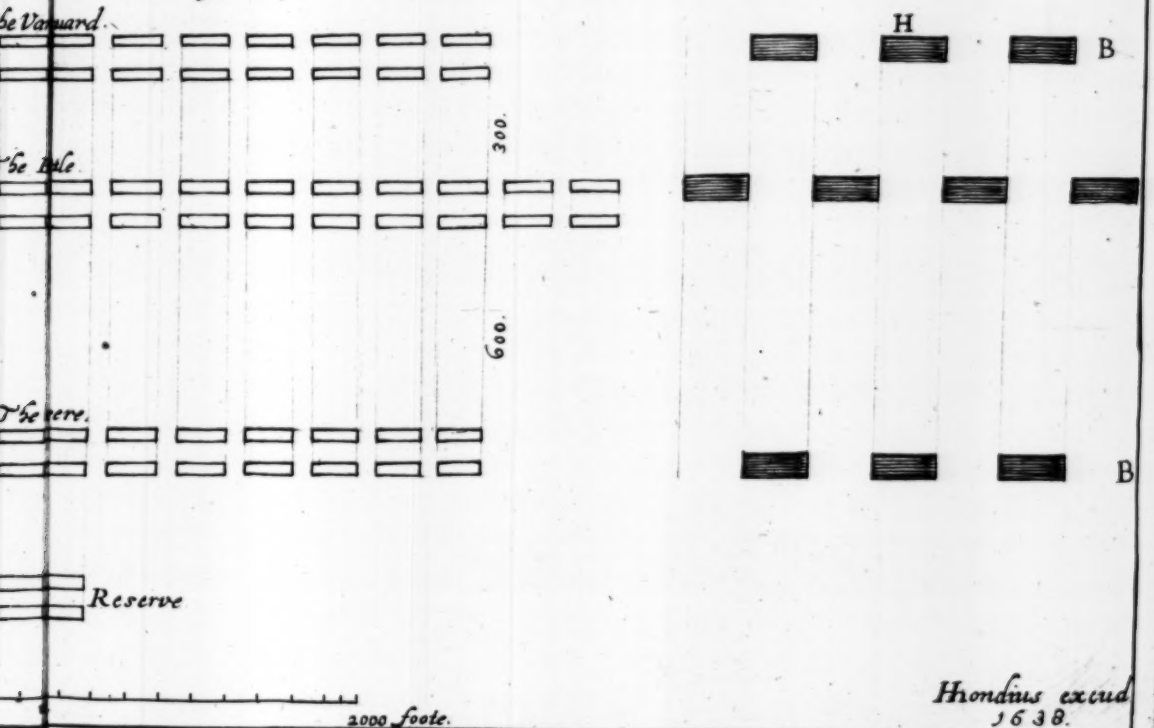
et Muskettiers en battailed.



é en trois Brigades, duquel le Front de A. B. á 5054. pieds.

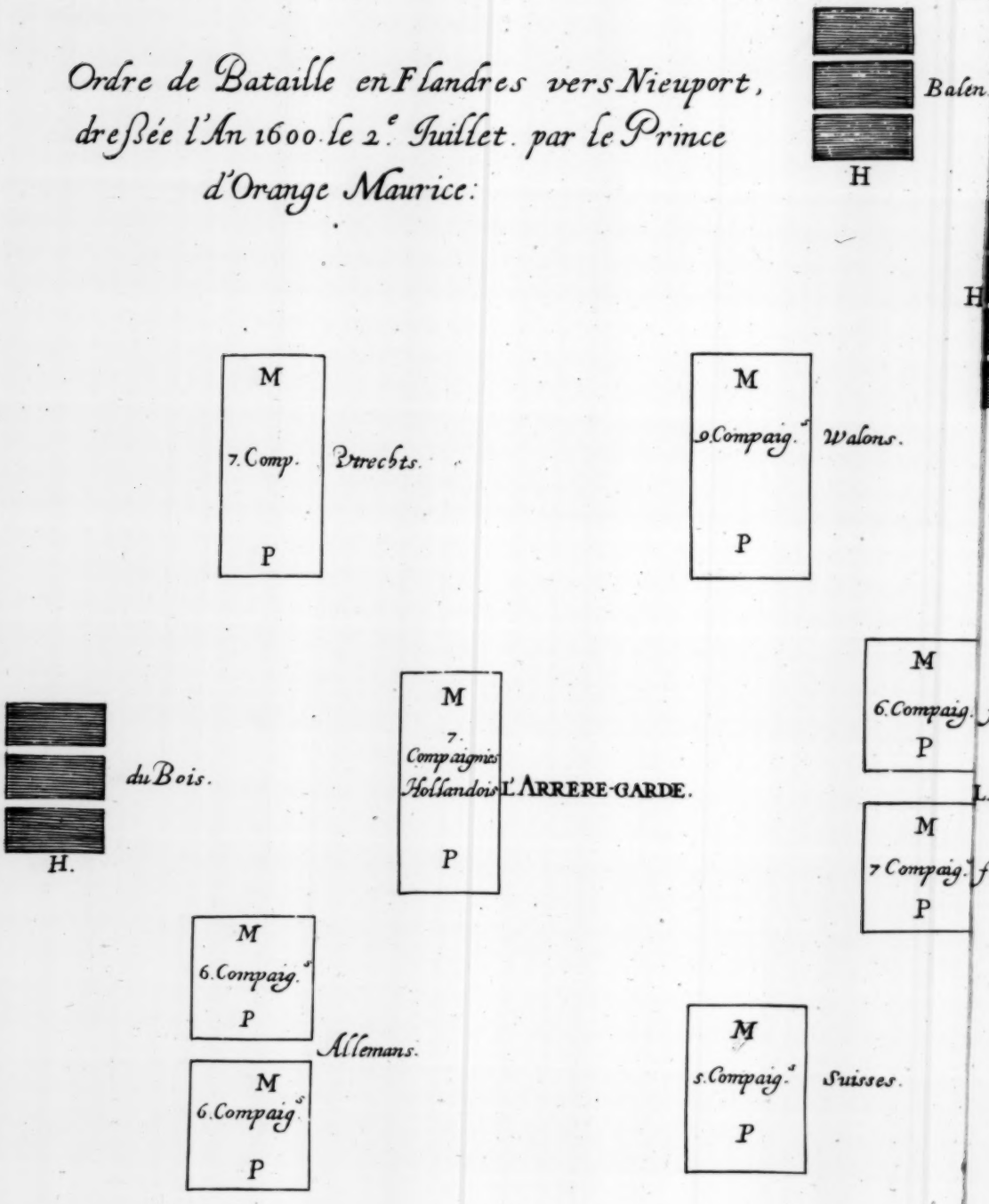
sant Foote & 6000 Horse, ranged into three les ó Tercias

rom A to B is 5054. foote.



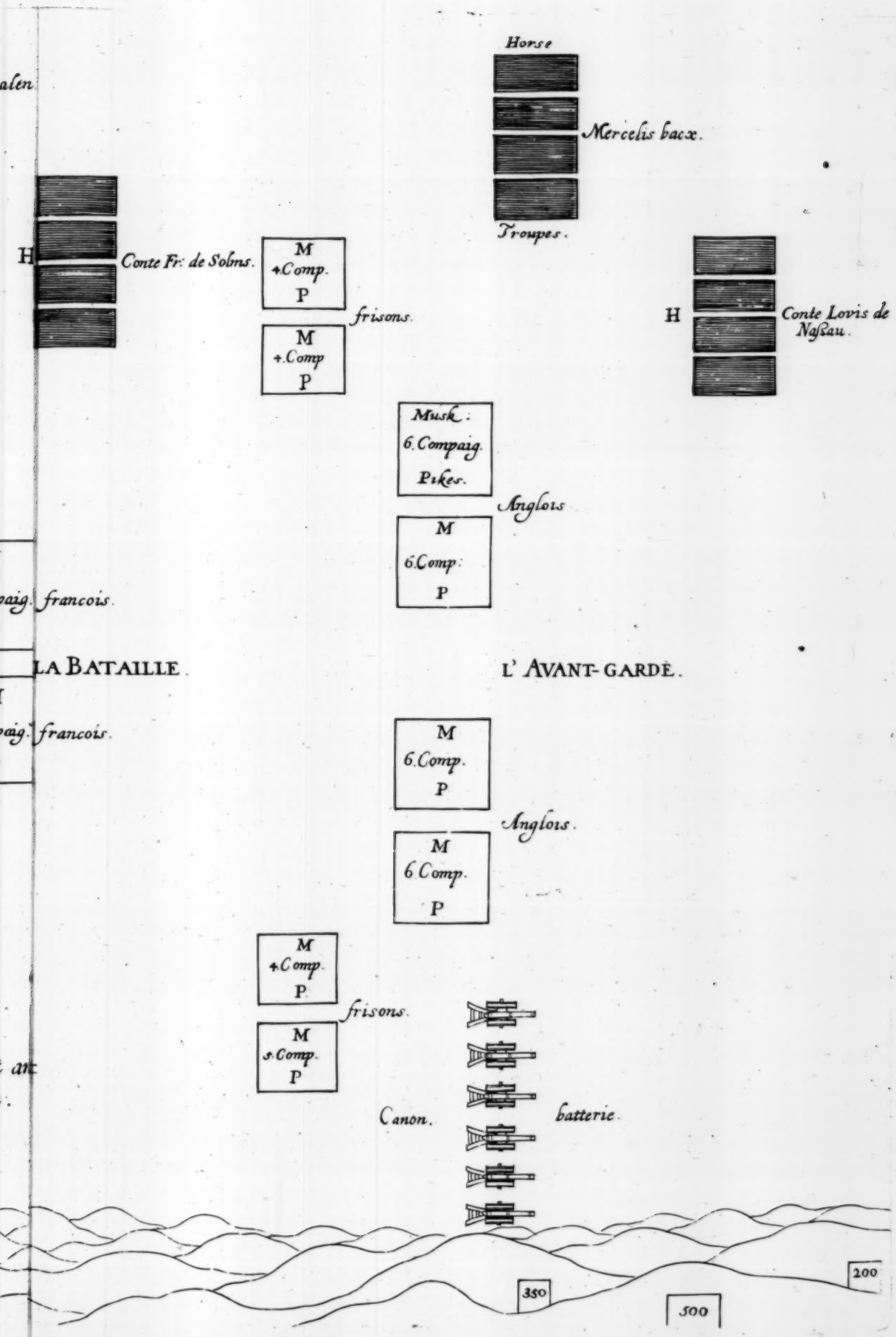
Hondius excud 1638.

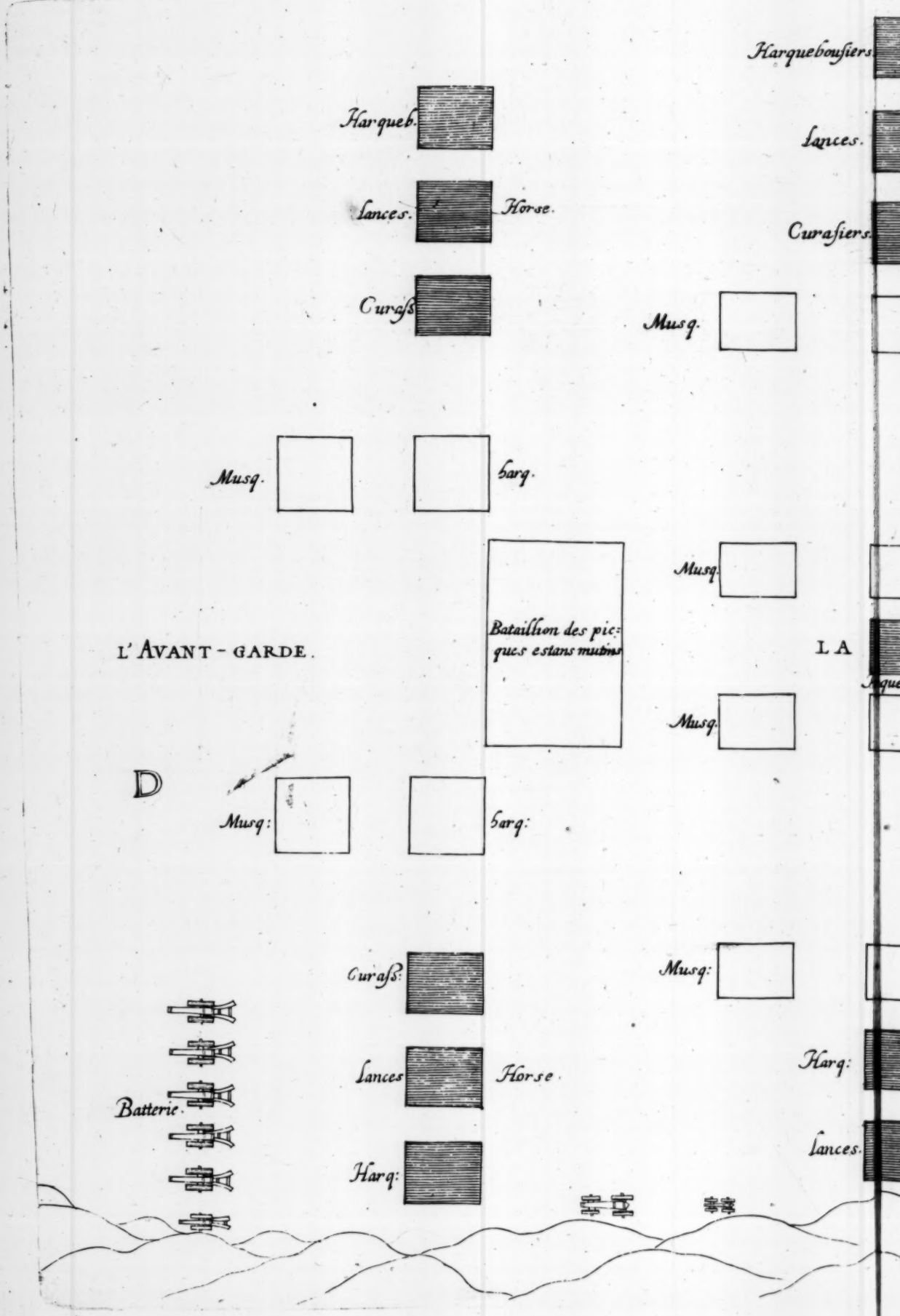
Ordre de Bataille en Flandres vers Nieuport, dreſſée l'An 1600. le 2.e Juillet. par le Prince d'Orange Maurice:



The forme of the Battle of Nieuport in flanders ordered, fought an wonne the second of July anno 1600. by Maurice Prince of Orange.

C


Horse
Mercelis bacx.
Troupes.
H
Conte Fr: de Solms.
M
4. Comp.
P
frisons.
M
4. Comp
P
H
Conte Lovis de Nassau.
Musk:
6. Compaig.
Pikes.
Anglois
M
6. Comp:
P
francois.
LA BATAILLE.
L' AVANT-GARDE.
francois.
M
6. Comp.
P
Anglois.
M
6. Comp.
P
M
4. Comp.
P
frisons.
M
5. Comp.
P
Canon.
batterie.
200
350
500


Harqueb.
Lances.
Horse.
Curaſs.
Musq.
Harq.
L'AVANT-GARDE.
Bataillon des pic-
ques estans mutins
D
Musq:
Harq:
Curaſs:
Lances
Horse
Harq:
Batterie.
Harquebouſiers.
Lances.
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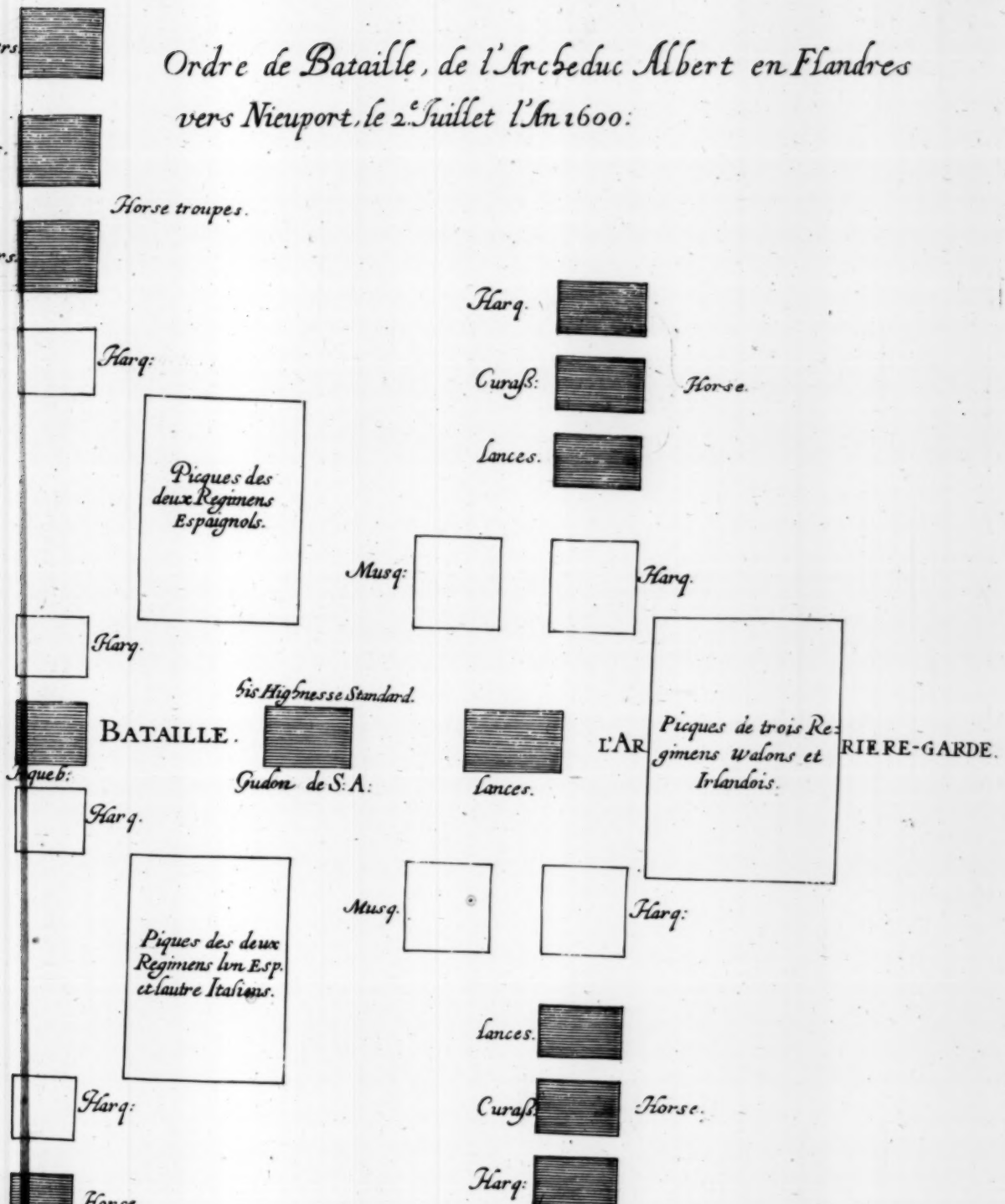
Musq.
Musq.
Musq.
Musq:
Harq:
Lances.
LA

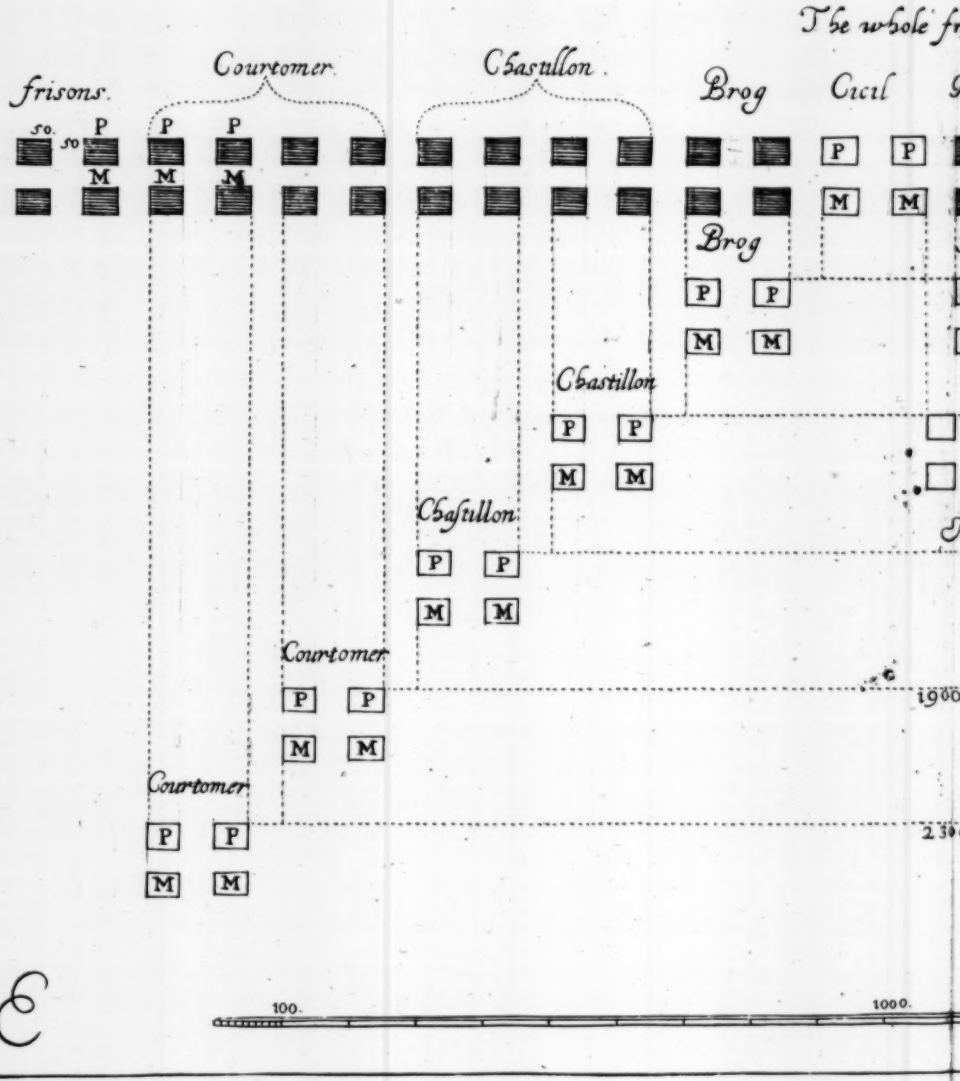


The forme of Battle held by Albert Archduke of Austria. neere vnto Nieuport in Flanders the second of Iuly anno 1602.

Ordre de bataille d'Infanterie, ordonné par le feu Prince

The second forme of a Battle of foote ordered by Maurice Prince of Oran

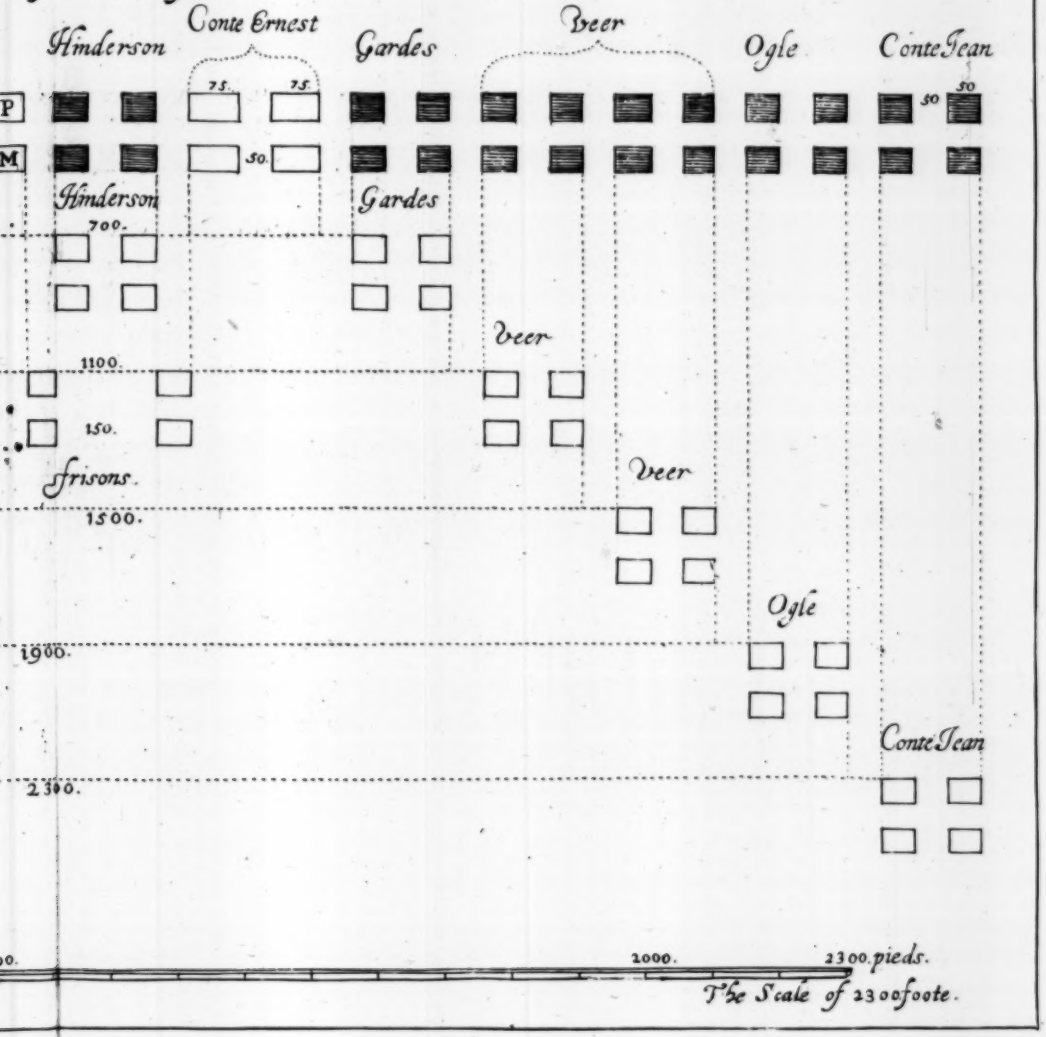
The whole fr



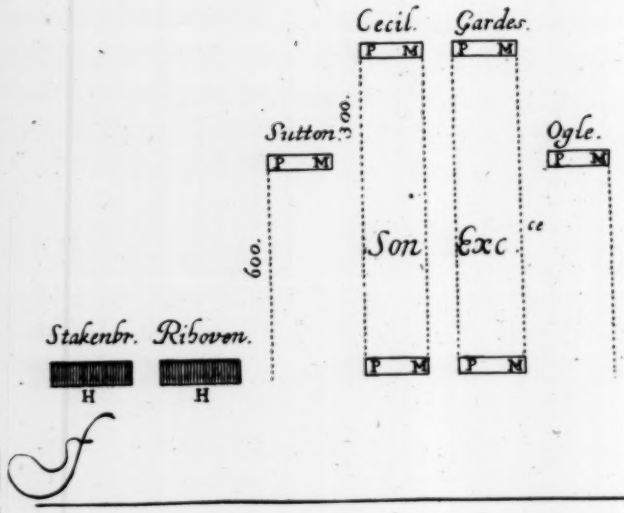
nce d'Orange Maurice, de tres-haute memoire. l'An 1605.

f Orange of famous memorie before Rees Anno 1605.

ole front. 2600. foote.



The Scale of 2300 foote.



Premiere forme de l'Ordre d

le 23.e Septembr

The first forme of the order o

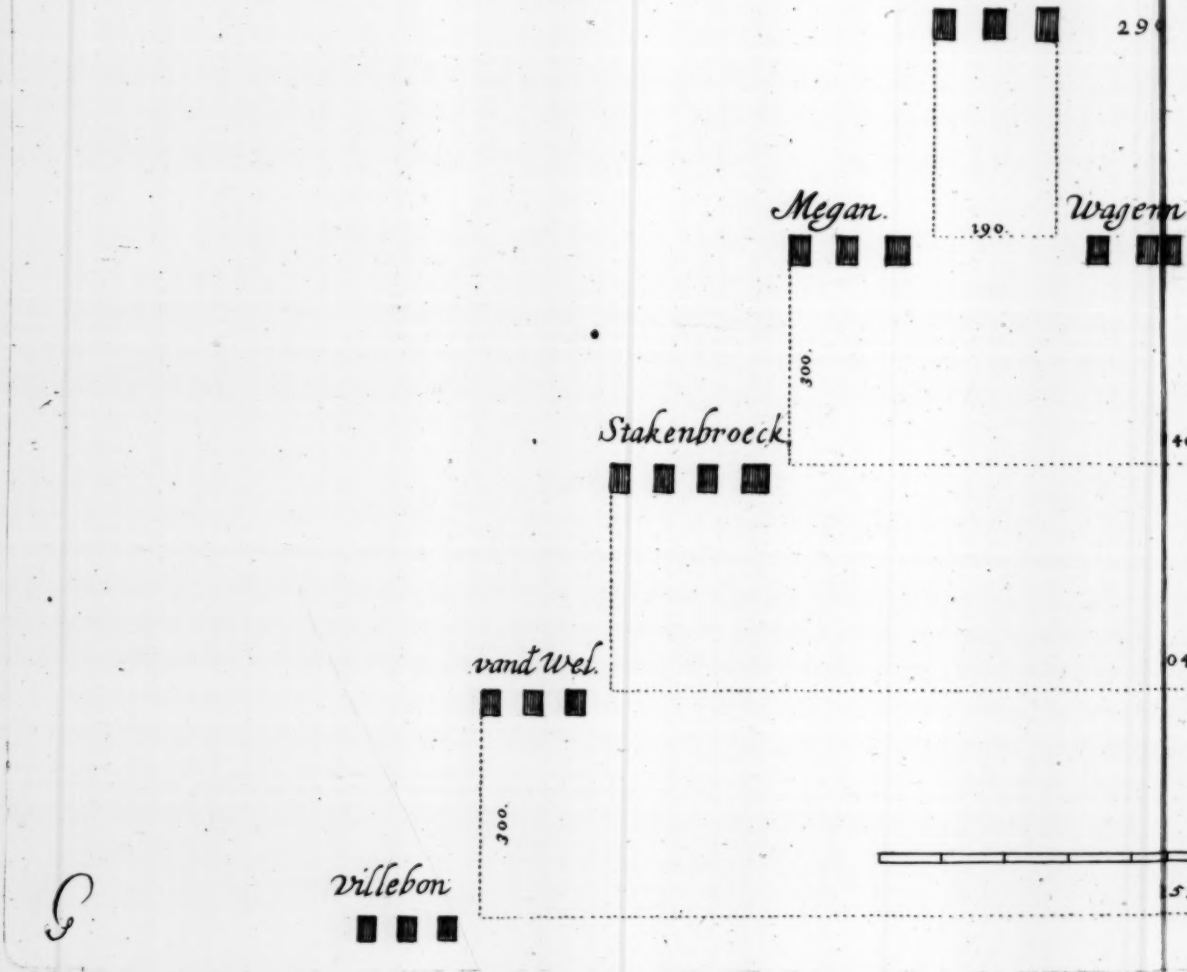
Septembe

The scale of

Ordre de Bataille de 37. Compaignies d

Tout le front est de

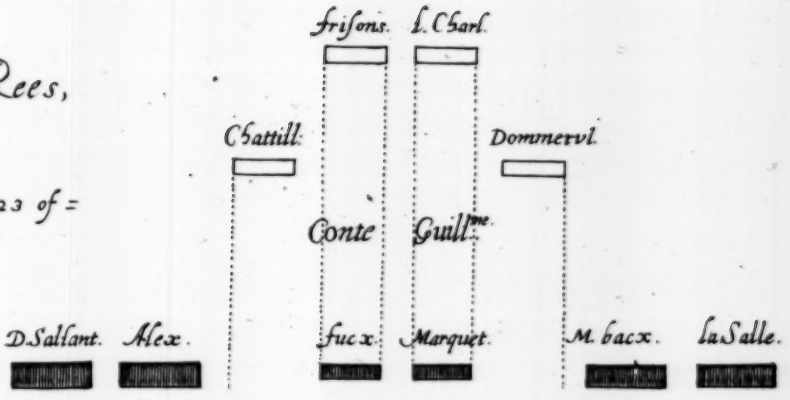
The Order of Embattailling 37. troupes of Horse before Rees the 23 of



dre de Bataille devant Rees,

bre 1605.

der of Battle before Rees the 23 of =
nbe 1605.



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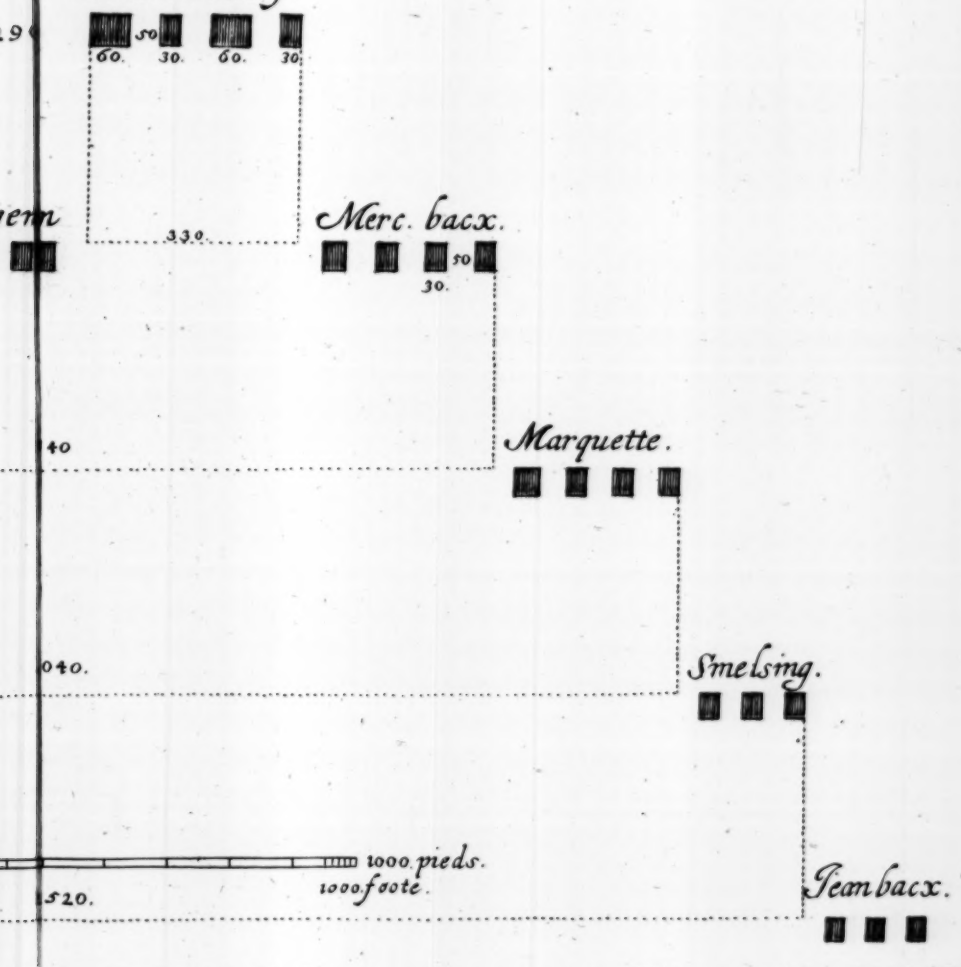
de Cavaillerie devant Rees, le 23. Septemb. 1614.

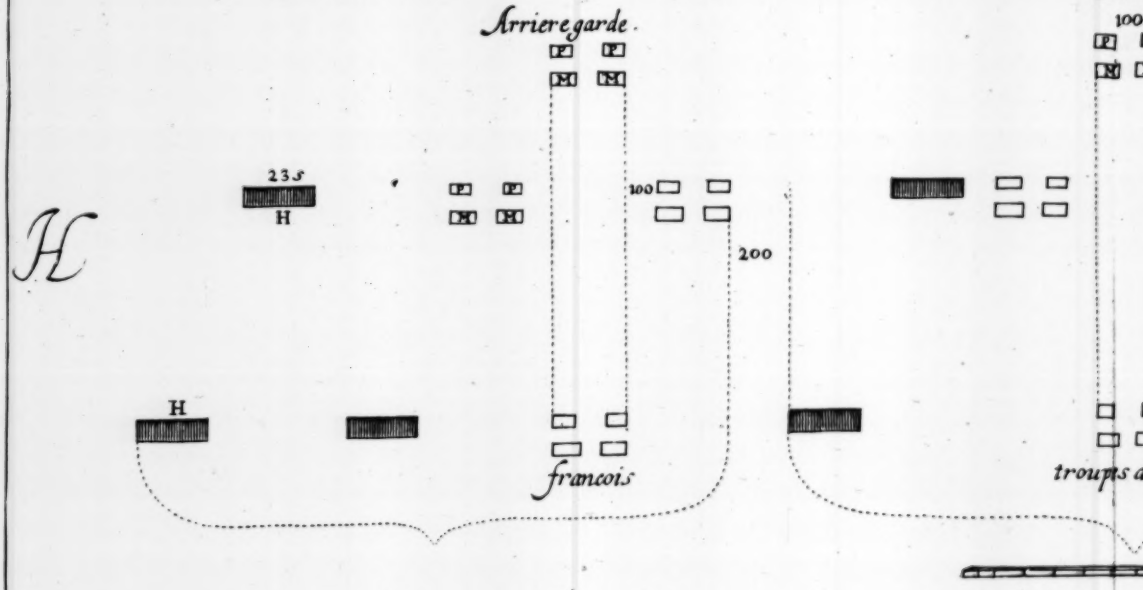
este de 3000. pieds.

23 of September 1614. the whole front is 3000. foote.



Premiere forme d'ordre de Bataille devant Iuliers dres

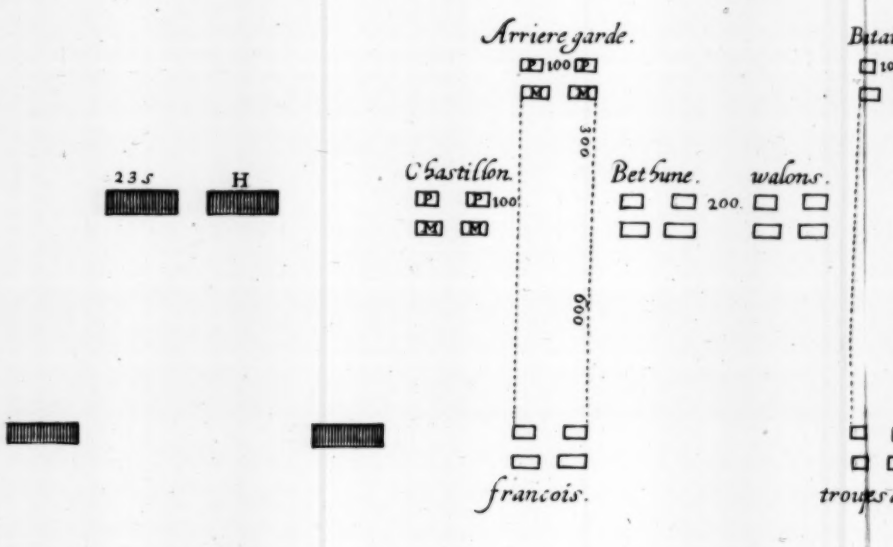
The first forme & order of Battle showne before Gulick anno 1610



H

Seconde forme de lordre de Bataille dressée, depuis

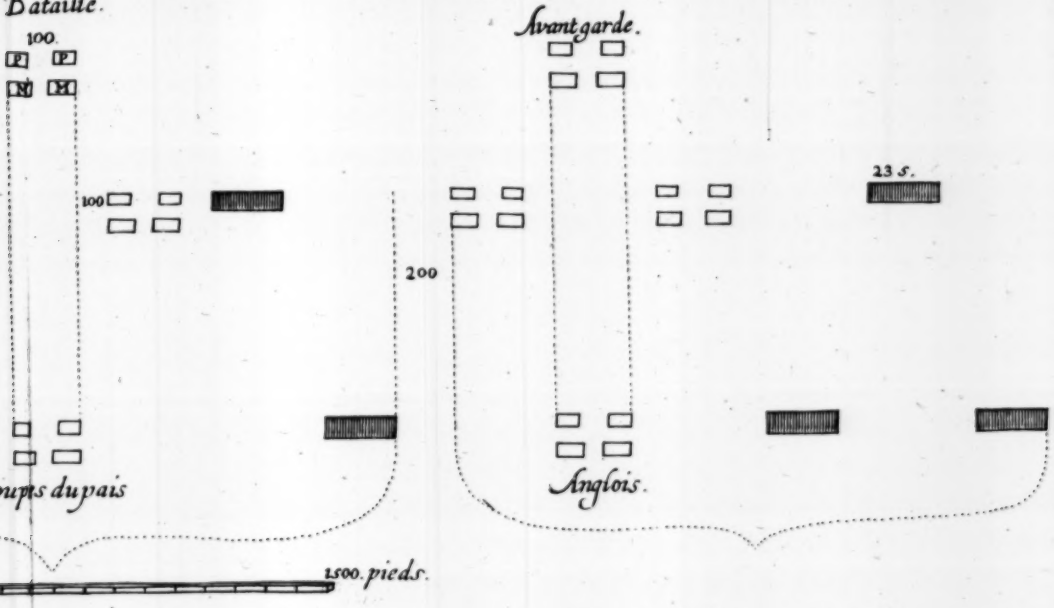
The second forme of Battle showne in marching from Dorstenberg



I

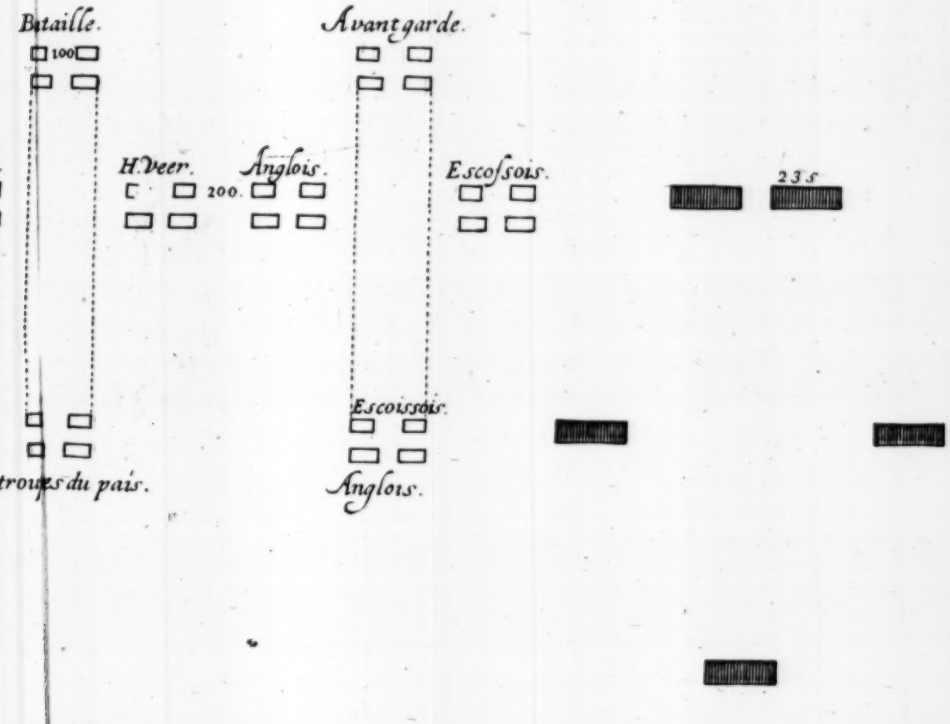
ressée l'an 1610. en marchant depuis Vorstenberg.

1610. in marching from Vorstenberg.

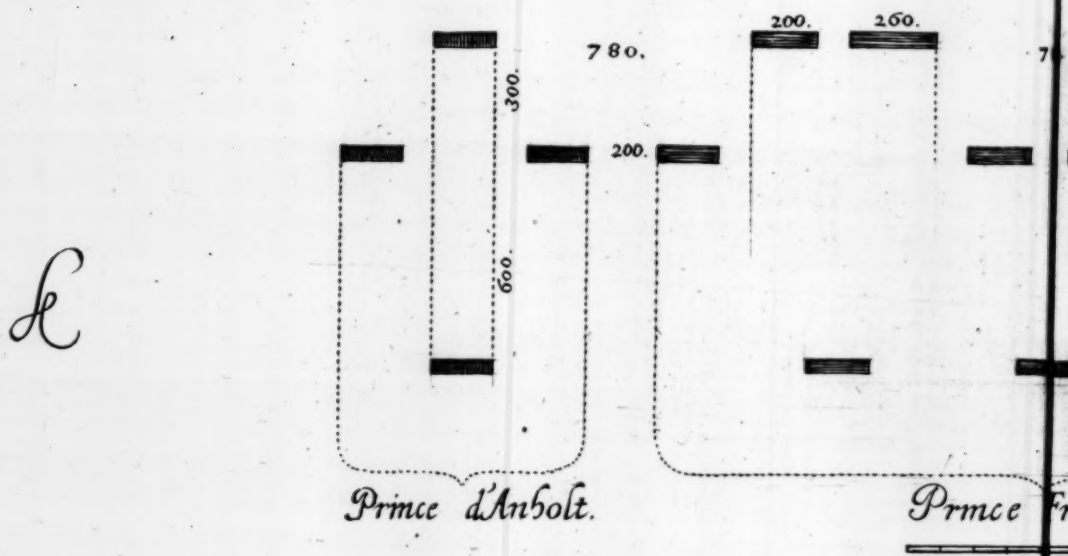


uis Vorstenberg vers Juliers, le 22e Aoeust 1610.

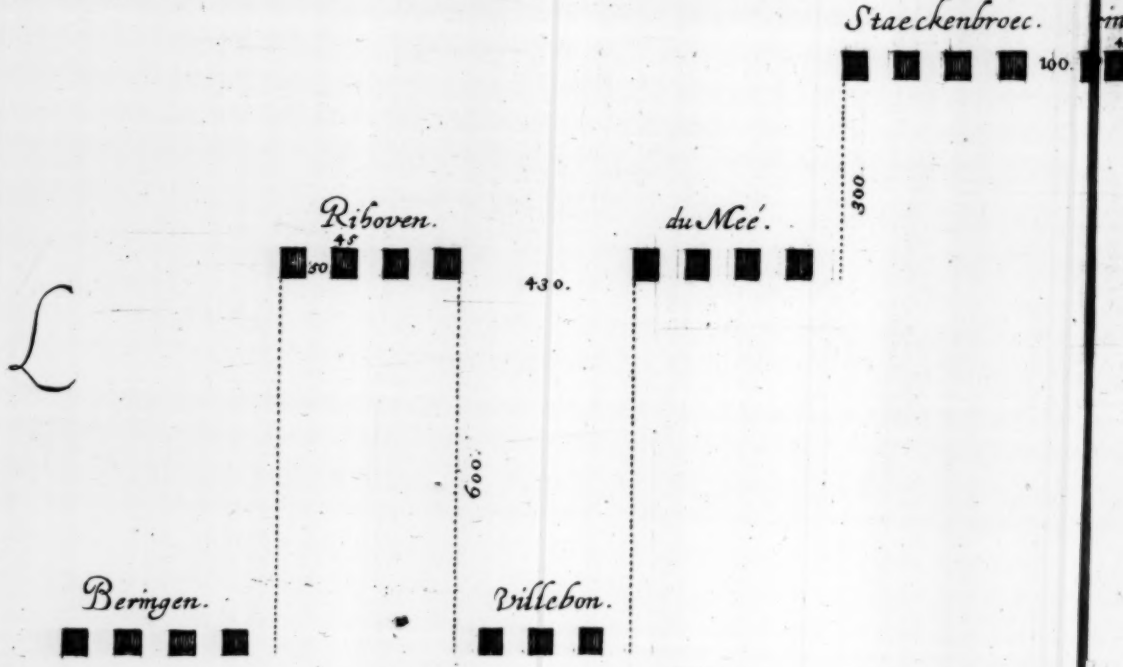
berg towards Gulick, the 22. of August 1610.



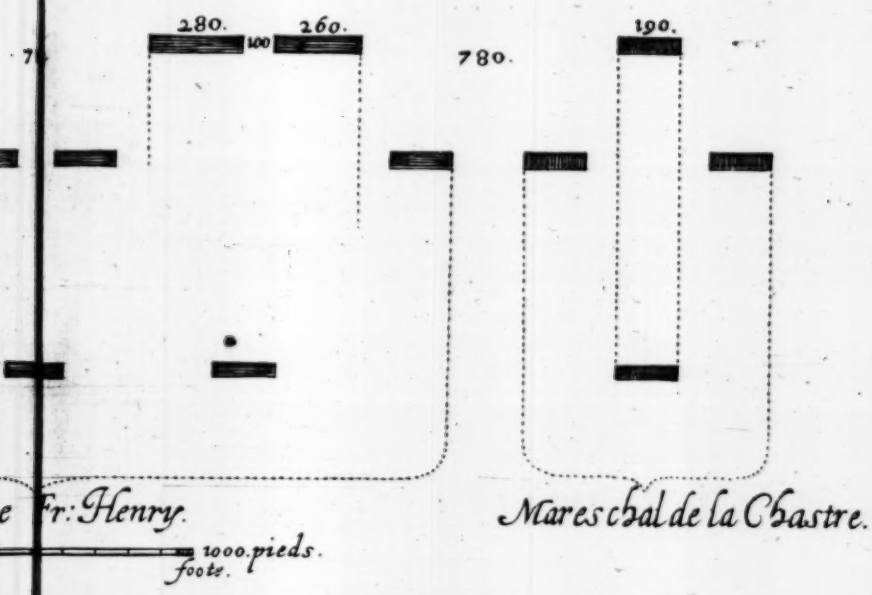
A Forme of Horse Embattailed b
Ordre de Bataille de Cavaillerie devant



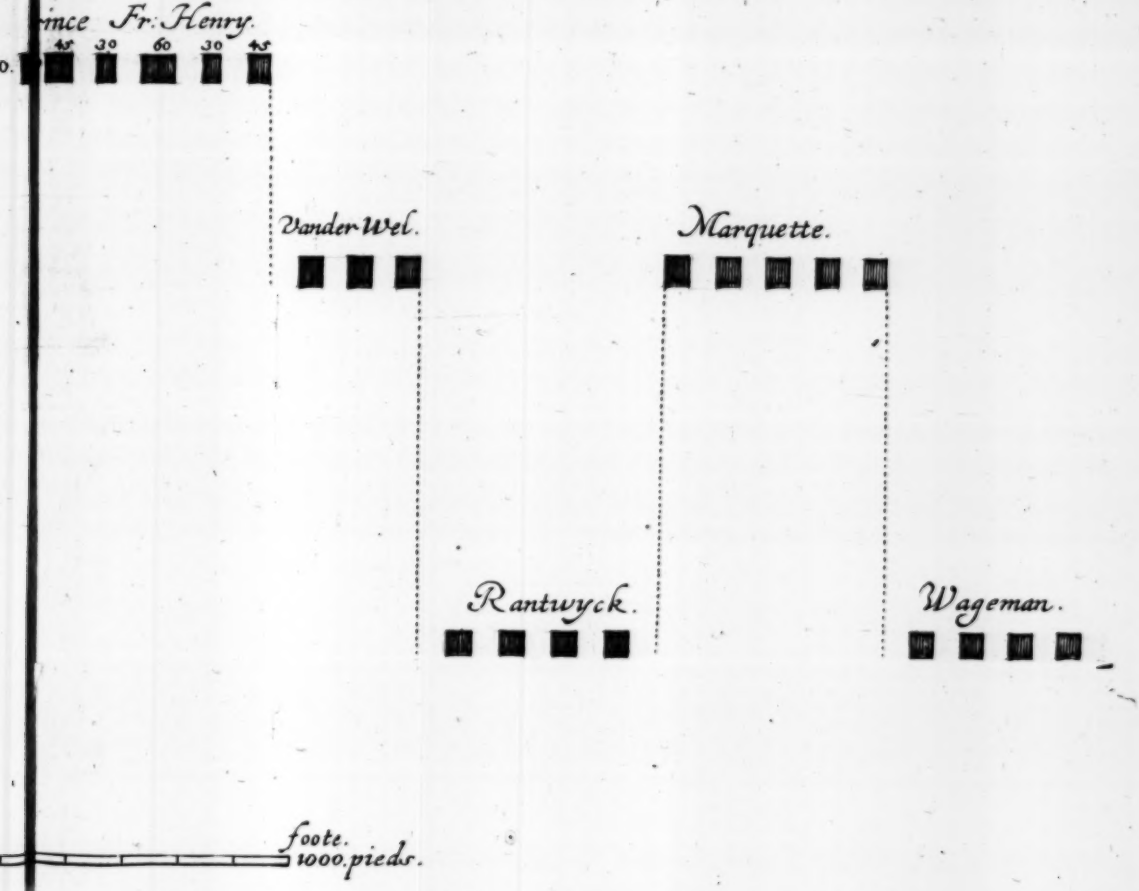
An other forme of Embattailing Ho
Ordre de Bataille de Cavaillerie de



l b[illegible]ore Gulick Anno 1610.
nt [illegible]liers l'An mille sixcent et dix :



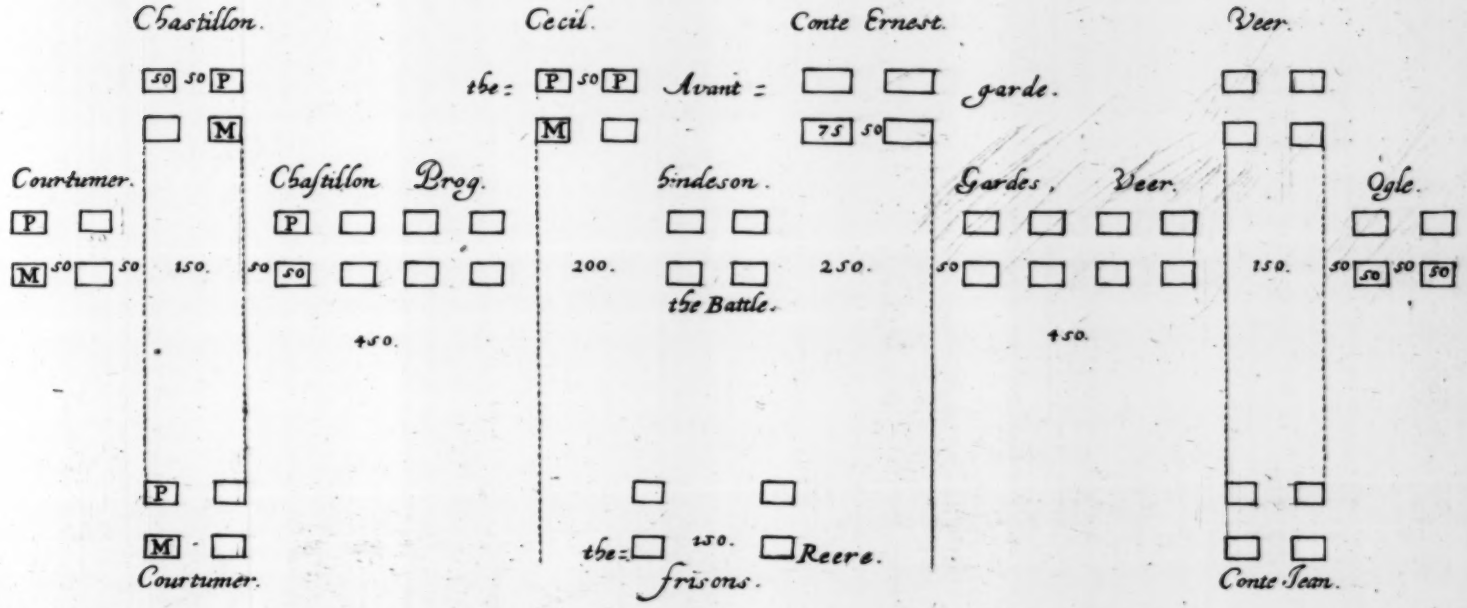
Ho[illegible] shoune before Rees by his Ex.ce 1621.
de[illegible]t Rees, ordonné par son Exc.ce en octob: 1621.



Ordre d'Infanterie en bataille devant Rees l'An 1614 duquel le front est: long 2200 pieds, et la hauteur 740 pieds.

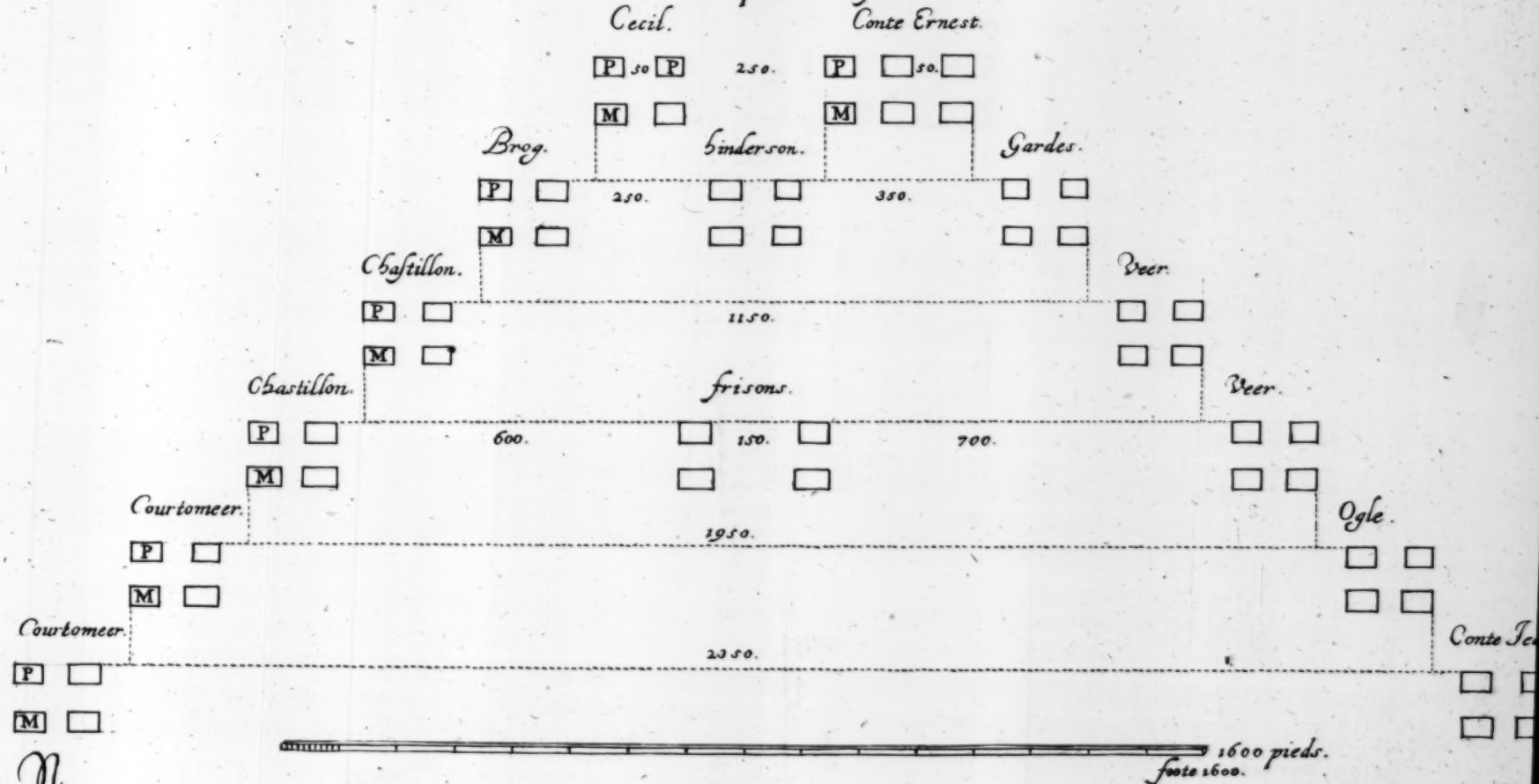
The forme of a Battle of Foote shoune before Rees Anno 1614.

The whole Front is 2200 foote. & the depth 740. foote.



Autre Ordre d'Infanterie en Bataille devant Rees l'an 1614. duquel le front est long 2750. pieds, et la hauteur 1160. pieds.

An other forme of Embattail. foote showne before Rees 1614. where the Front is 2750. foote. & the depth 1160. foote.

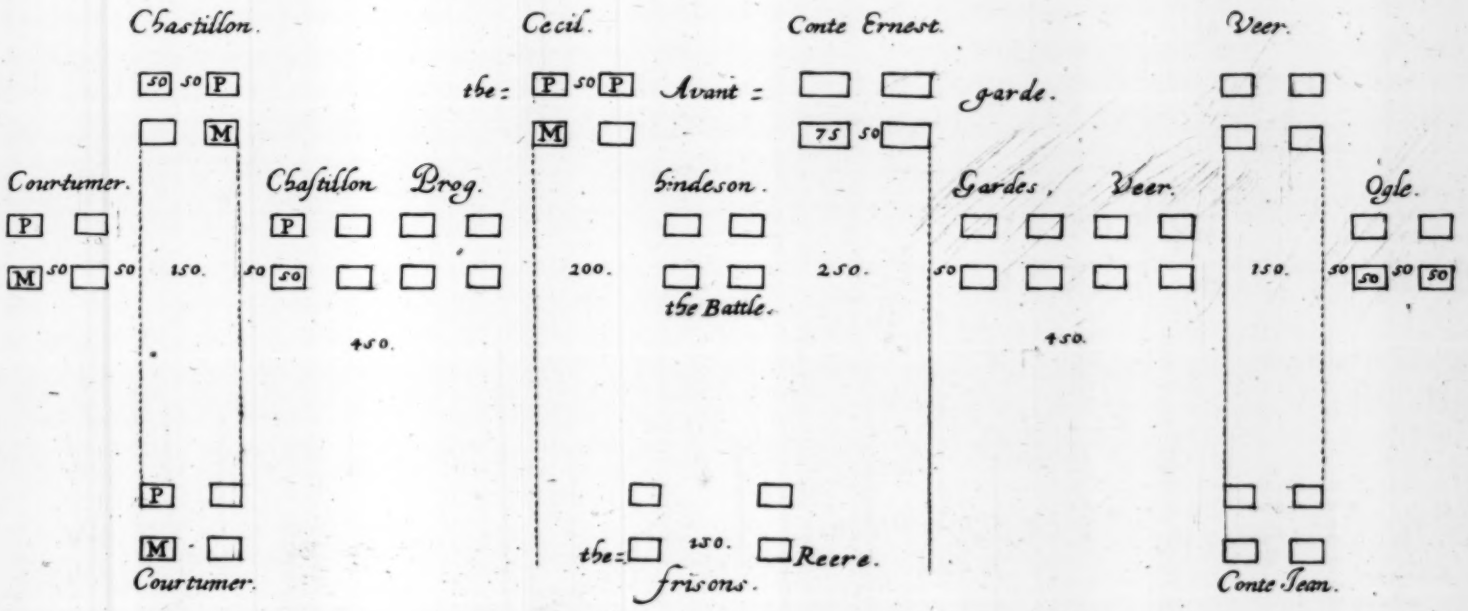


N

Ordre d'Infanterie en bataille devant Rees l'An 1614 duquel le front est: long 2200 pieds, et la hauteur 740 pieds.

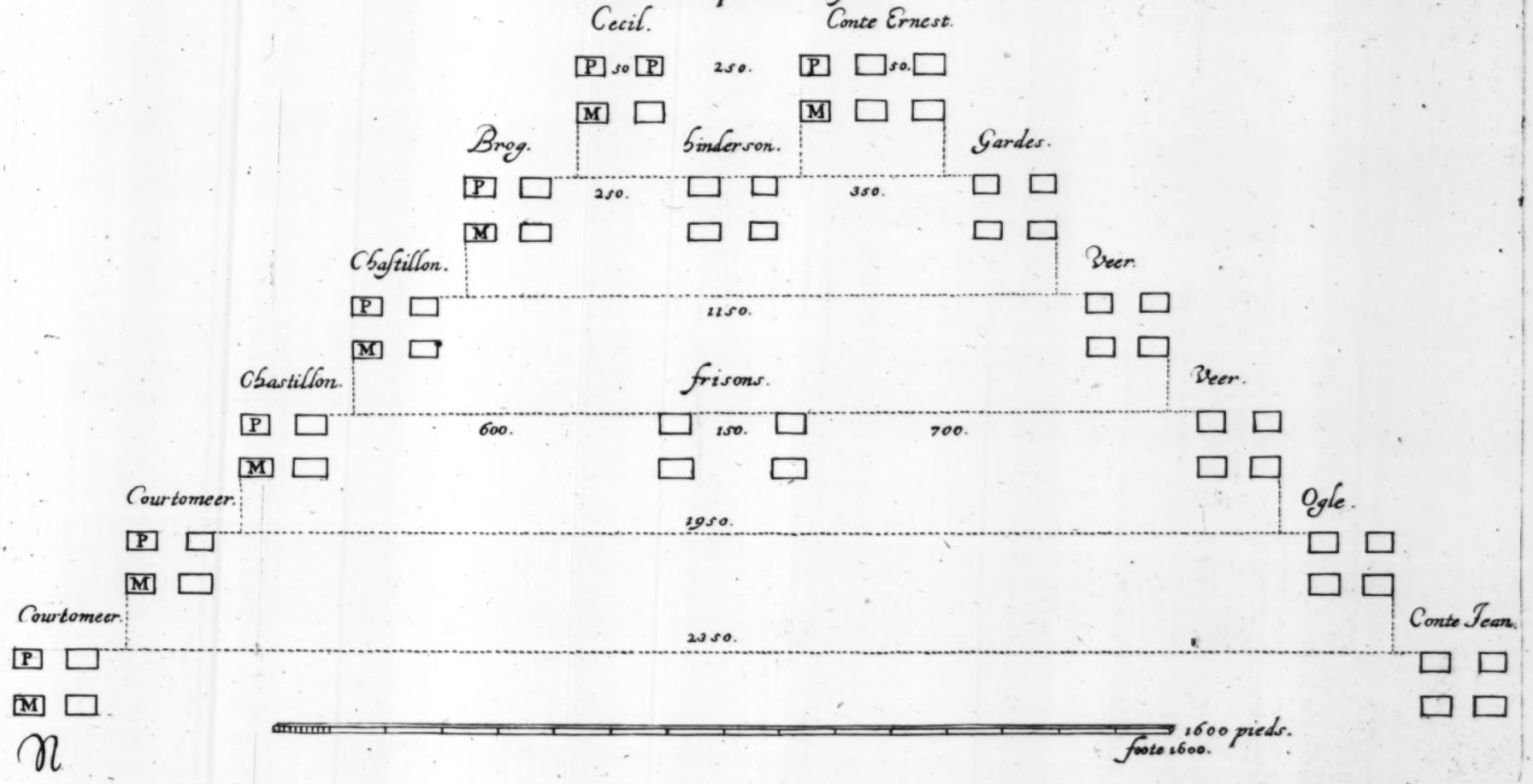
The forme of a Battle of Foote shoune before Rees Anno 1614.

The whole Front is 2200 foote. & the depth 740. foote.



Autre Ordre d'Infanterie en Bataille devant Rees l'an 1614. duquel le front est long 2750. pieds, et la hauteur 1160. pieds.

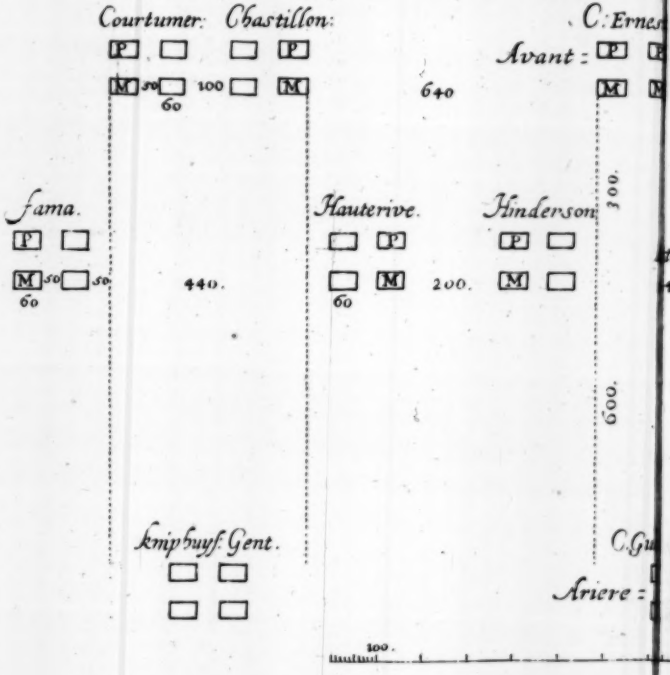
An other forme of Embattail. foote showne before Rees 1614. where the Front is 2750. foote. & the depth 1160. foote.



N

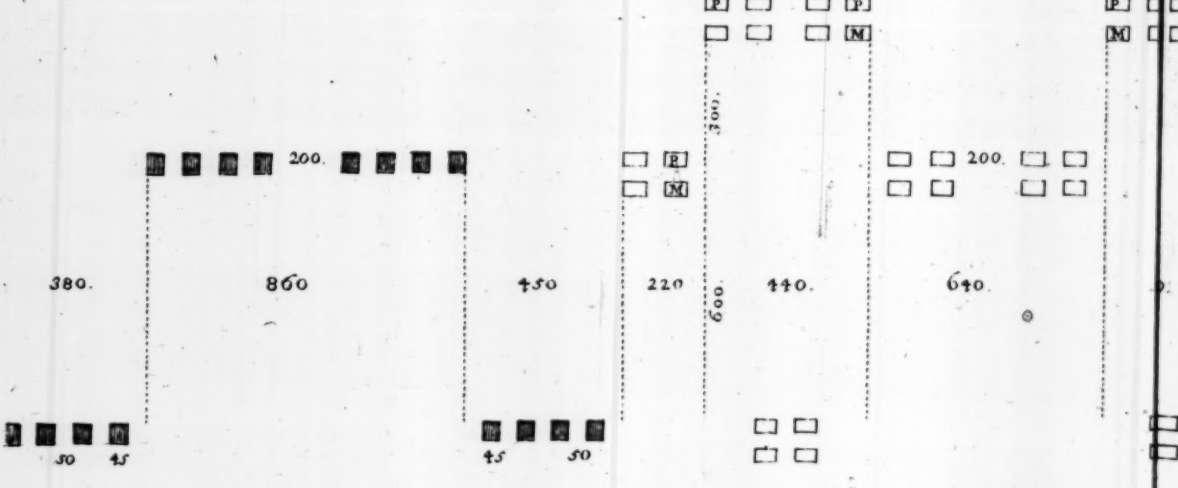
Premiere Ordre d'Infanterie en

The first forme of foote embattailed by Prince

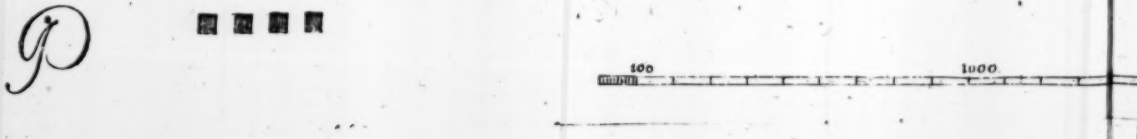


Seconde Ordre de Bataille de Cavaillerie, et Infanter

Tout le front de

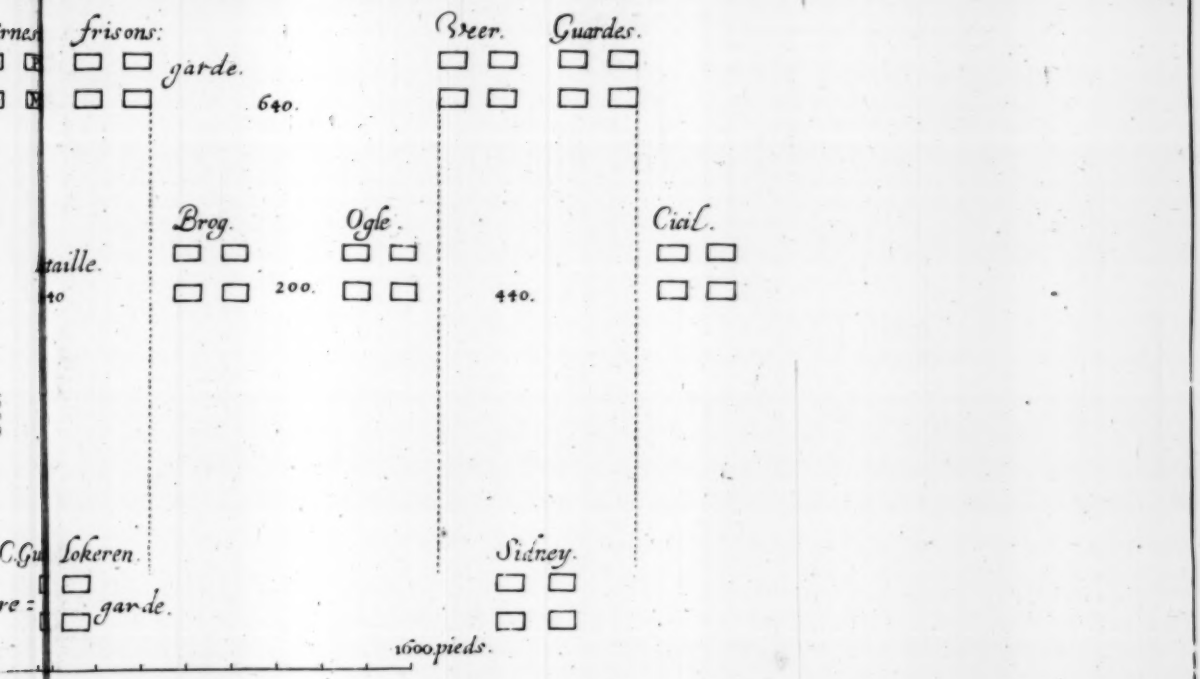


A Second forme of Horse & foote embattailed ordered by his Ex fo



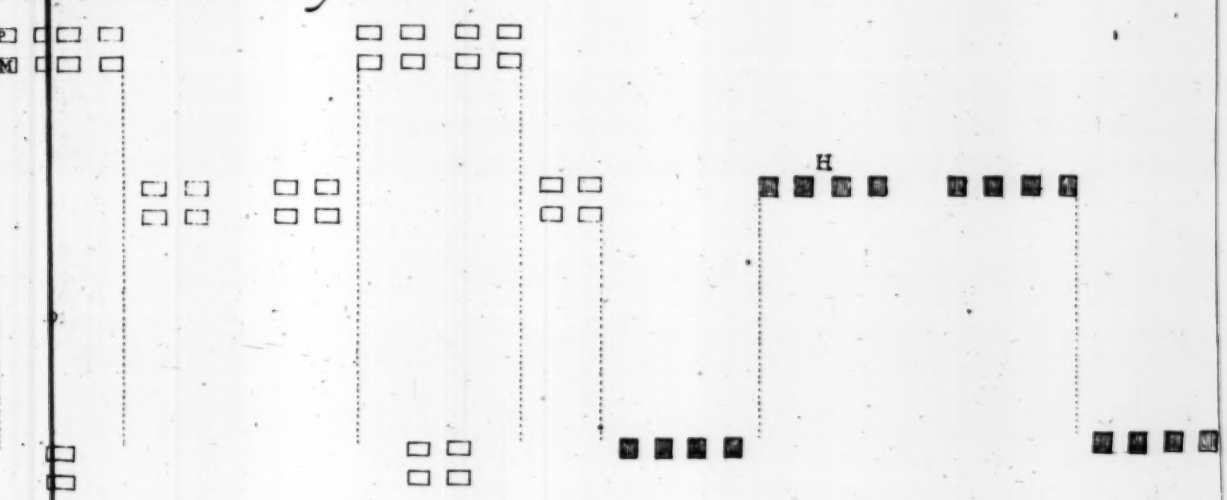
n Bataille devant Doormick. l'An 1621.

nce Maurice at Doormick anno 1621.

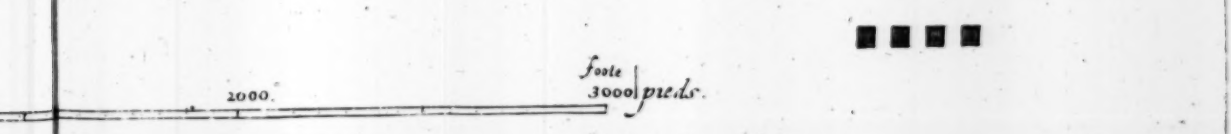


ter, Ordonné par Son Exc.ce devant Doormick. le 11.e de Septemb.

le Bataille a 6380 pieds

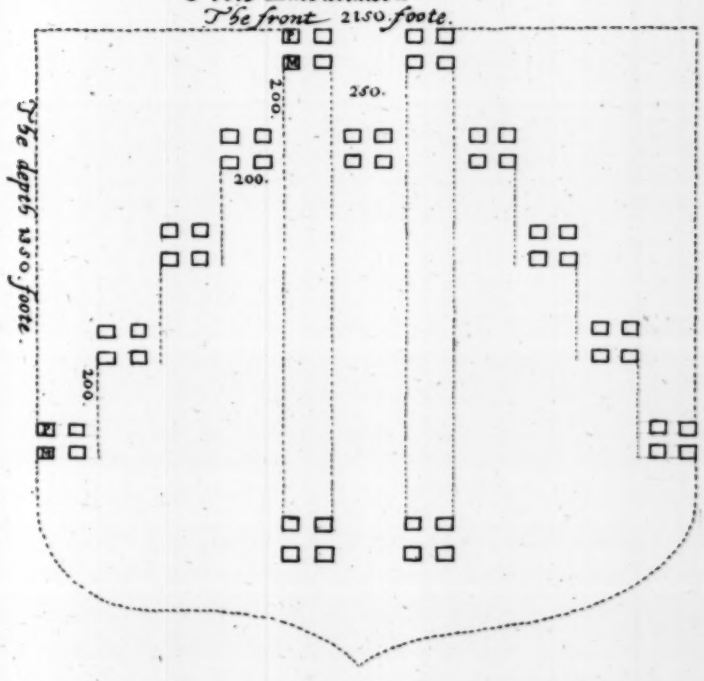


Ex fore Doormick the 11.th of September 1621.



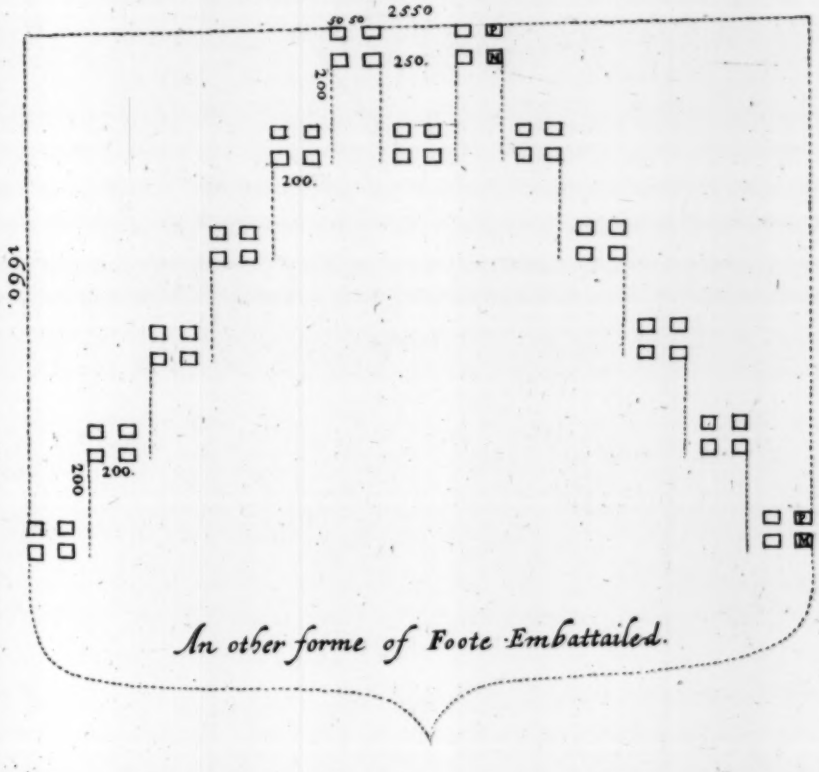
Infanterie en Bataille.

Foote Embattailed.



Q

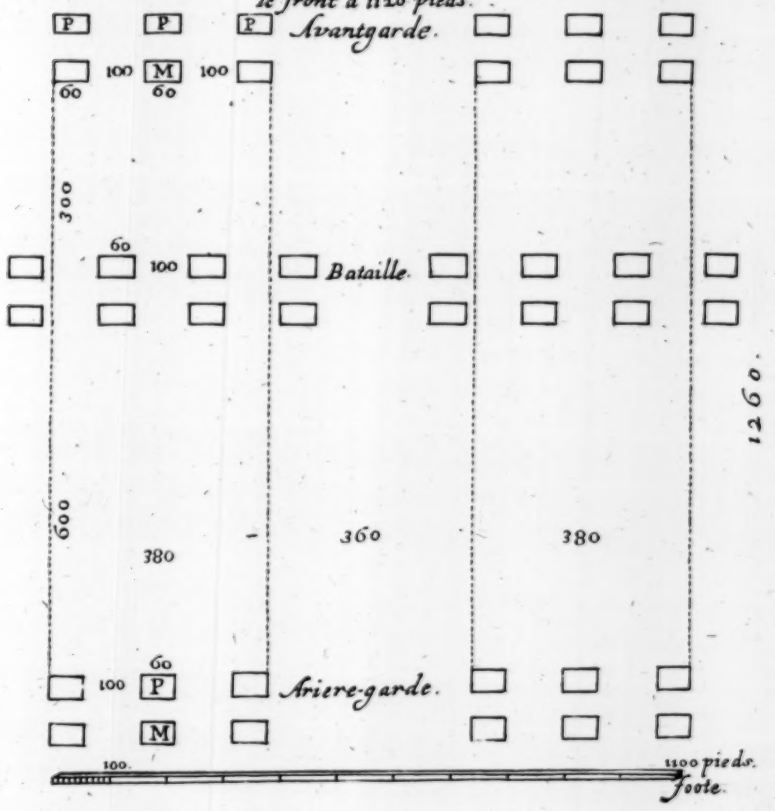
Autre Ordre d'Infanterie en Bataille.



An other forme of Foote Embattailed.

R

Ordre d'Infanterie en Bataille pres Nimmege. 1624.

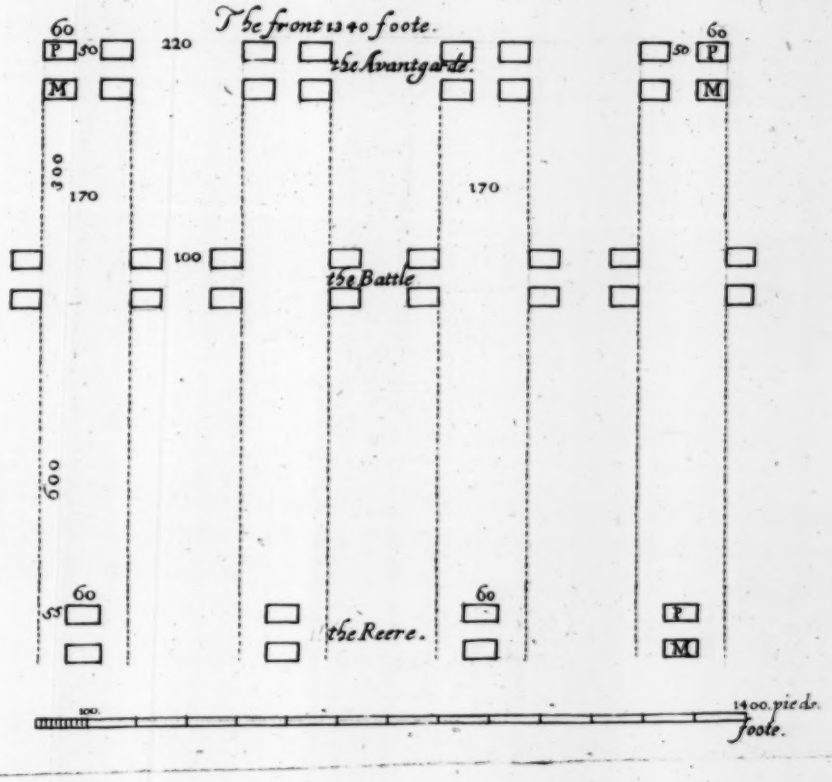


The forme of the Prince of Orangeer his Battaile = by Nemegen 1604.

S

Ordre de Bataille Ordonné par le Prince Henry á Walwic.

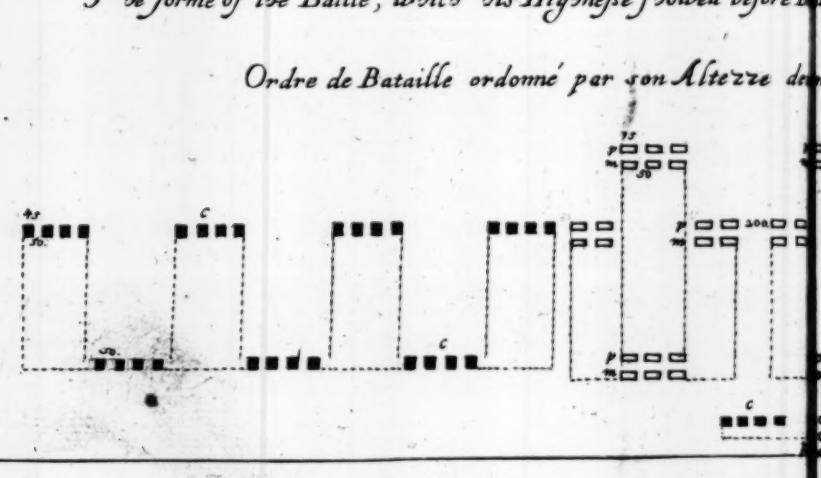
Forme of Battle ordered by his highnesse the Prince of Orange at Walwich.



T

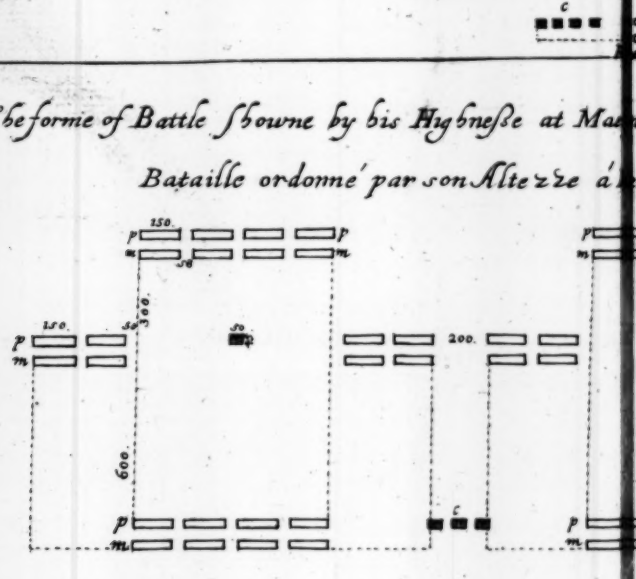
The forme of the Battle, which his Highneſſe ſhowed before

Ordre de Bataille ordonné par ſon Alteze



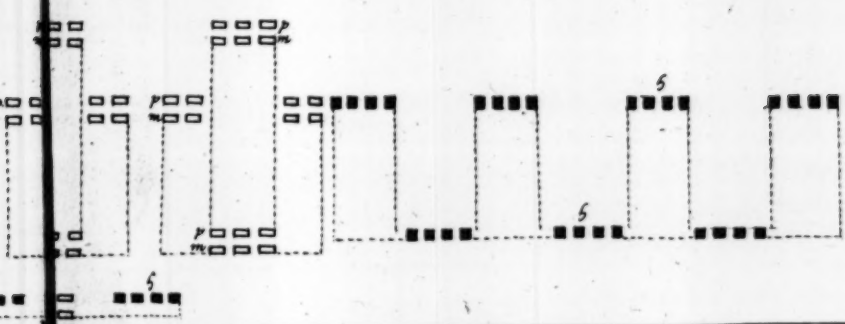
The formie of Battle ſhowne by his Highneſſe at Ma

Bataille ordonné par ſon Alteze á



re Bda anno 1634: The Front is 8195. foote.

dent Breda l'an 1634. le front á 8195. pieds.



Ma the 10.e of June 1635: the Front is 5050. foote:

á ersen le 10.e de Iuin 1635. le front á 5050. pieds.

THE ORDER AND FORME OF QUARTERING *and Encamping of an Army.*

HAving showne the figures of Generall *Formes*, and orders of embattailling, ranged in the wars of the vnited Provinces, vnder the Command of his Excellency *Maurice Prince of Orange* of famous memorie, and his Highneſſe *Frederick Henrie Prince of Orange*, our Captaine Generall that now is: I will proceede on and shew how, and in what manner an Armie ought to be encamped, with the ſeverall diviſions of their quarters, beginning firſt with a Company of Foote, and Horſe, then with a Regiment, and afterward an Armie entrenched, and laſt of all come to handle *Approches*, and all things depending thereupon, for the beſeiging and takeing in of a Towne or Fortreſſe: which for the moſt part, I have tranſlated out of *Mr Adam Fritach*, an excellent Mathematician, in his booke printed. *Anno 1635.*

THE FIRST CHAPTER.

Of three ſorts of Campes or Leagers.

THere are three kindes of *Campes*, The firſt is called in Latine *Caſtra Temporanea*, that is, A *Campe* which ſtaies not long in a place, but removes and changes euery day: the ſecond *Caſtra Stratoria* a ſettled Campe, which environeth a Towne, or a Fortreſſe with intent to take it in, and the third is called *Caſtra Suſtentoria*, a Campe lying vpon a paſſage, or river to ſtop and hinder the incurſions of an Enemie from getting into a Countrie.

The Campe which diſlodgeth euery moment it's called Caſtra Temporanea.

This Campe is alſo called a *Flying Leager*, having no certaine place of abode, but at every motion, is continually to attend an Enemie vpon every remove, and this Armie is to encampe, when the Enemies Armie encampeth, and therefore is called a *Flying Campe*, becauſe it is to hinder the Enemies progreſſe.

A Campe having a trench Caſt vp about it, or beſet with Turne Pikes and Paliſſadoes.

Now for a *Campe*, which is ready to remove vpon an inſtant, we vnderſtand that, which takes vp a quarter onely for one night, which forme requires a great deale of wiſedome, and circumſpection, eſpecially when it is to march, or Quarter not farre from an Enemies Countrie. Therefore, it is very neceſſarie, that the *Generall* ſends out before, a good number of Horſe, to view, and informe themſelves of the nature, and condition of that place, where the Armie is to Quarter that night, for the accommodation where of, they ought to chuſe, as neere as poſſibly may be, a place ſituated in a plaine Feild, to which the Armie being come (and that in good time by day) the Quarters ſhall be made neere vnto the adioyning villages) if there be any and the Horſe lodged about them, in places of danger moſt ſuſpected. A campe may be encompaſſed with a Trench 4 foot high, and 3 foote broad for their more ſafety againſt an Enemie, which otherwiſe might give an attempt vpon ſome part of the Armie. The moorish grounds, where an Enemie is not feared, that may be beſet with *Turne Pikes*, or with *Paliſſadoes*, which may be taken vp againe, when the Campe removes.

After the Trenches are in defence, the Souldiers begins to make their huts of forks, lathes, withes and ſtraw, or for a night onely with ſticks and boughes, or ſuch things as they can get, the carriages and waggons laden with Amunition, Materials, and Victuals are to be lodged in the middeſt of the Campe, with a ſmall trench caſt vp round about them, but ſome peeces of Ordinance are to be planted vpon thoſe *avenues* and paſſages, where an Enemie may beſt give on vpon the Campe when the watches, and the Centinels are diſpoſed of, the reſt of the Armie goes to take their reſt, the next morning at the breake of the day and at drummes beating the Armie diſlodges, and every one makes ready for to

march away, while the trench is a Casting downe, lest an Enemy, which followes the Armie might lodge in the same quarter.

But if the Armie is not to march through an Enemies Countrie, and that one is assured they cannot come neere vnto the Campe so soone it is not necessarie to environ the Campe with trenches, but the Souldiers are either Quartered in houses, or feilds next adioyning to them, in disposing of guards, and Centinels in every place needfull, and this order of march is observed everie day, till the Armie is come vnto that place, which is resolved to be beseiged, where then a formall, and a setled Quarter called *Castra Strataria* is made.

Castra Strataria and the proprieties thereof.

The propriety of this Campe may be observed well out of the Instructions of *Veget* in the 22 chapter of his first booke, as also in the *Castrametation* of *Hygnius Gromaticus*, according to these observations following.

First, that the Quarter be made in a safe place, that is, where there are no hils and heigths, which may commaund and serve as an advantage to an Enemie, when he resolves to relieve the Towne, or Fort beseiged, or to assault the Campe; for being lodged and fortifying himself vpon them, he may easilie overlooke the Campe, and then it is subiect to be played vpon by an Enemies Ordinance.

That it be made (if it be possible) neere vnto some brooke or river, which may commodiously serve, aswell, for the watering of Horse, and Cattell, as also for the Souldiers, and by which, with shipping, or boats one may bring vp Munition with provisions, and Victuals to the Campe, by the helpe of a running river, or the winde for the saving of excessive charges, when one is driven to bring them vp to the Armie by *Convoyes*, and waggons, which oftentimes causeth a dearth in the Armie: for commonly Victulars, and Sutlars raises the price of their Victuals, and commodities, according to the length of the way, if they be constrayned to bring them vp by waggon hire. Besides, it is a great advantage for a Quarter, to lie by a river side, because sometimes the water may be carryed round about the *Campe*, which will make it stronger, then if it were lodged in a plaine Feild, and fortifyed with some small Forts, and Redoubes; so that all that charge is saved in makeing of workes, if the Campe may commodiously be enclosed about with water. I say nothing of the great stinke, caused by dead Horse, and beasts, as also by Butchers and their shambles, which likewise is avoyded by the helpe of Water, neither are men so subiect to sickneese, and pestilence, which takes away many times a greater number of people, and weakens an Armie more, then if it were assaulted by an Enemie. For, the prevention of which inconvenience, the Carrions, paunches, and garbidges of Beasts are cast into it, and carryed away with the streame, and the Butchers quartered in the most remote part of the Campe.

One must also have a speciall care, that there bee no thick-bushes, and woods about it, where an Enemie may lie in *Ambuscade*, or fortifie themselves without any hindrance, which would keepe a Campe in Continuall feare, of being assaulted by an Enemie out of a wood.

To make choise then of the fittest places, to encampe and Quarter in, those are held the most commodious, which are situated in a plaine Feild, seing an Enemie may be discovered a far off, having then time to draw into Armes, to oppose them, and that the Canon may play vpon them, in case an Enemie would attempt to assault the Campe by force.

As many sicknesses are engendred by stanch, and the putrifaction of the aire: so likewise many are caused by Moorish grounds, *Marrish*, and bogs, in regard of the damps, and fogs, which riseth out of the waters, as also poysonable vapours, arising out of marshie grounds, whereupon the Souldiers huts are built.

And therefore one ought to be well informed, before a Quarter or a Campe be made for an Armie, whether those grounds bee covered or overflowne with water, which may often happen in *Autumn*, or *Winter*, which were a great annoyance, and hurt to the Campe, if it were driven to stay there all winter, and that one knew not the Condition of the place. Againe, it may serve for some vse to helpe the beseiged, or those which come to relieve the

Towne

Towne, when they may turne the water by some places into the Campe, or can cut some dikes or Seabankes, or keepe vp the water by banks, and sluces, to make it overflow the *Campagnie*, which will bring a greater dammage to the Campe, then fire would doe, therefore one ought to consider, and ponder well all these things, and to thinke vpon some remedie to prevent these inconveniences.

One ought also to make choise of such a place, which yeelds good store of grasse, and hay for Cattell, and straw for the accommodation of the Souldiers; because the want of fourrage for Horse, will constraine them to fetch it farre by convoyes, which is dangerous for the Souldiers, when an Enemie lies vpon the snap for them, and their Horses in those places, where they are driven to fetch their fourrage, which one is forced to doe with great *Convoies*, and excessive expenses. Also there must be care taken, that there bee no want of wood for fyring, and building of Souldiers huts, as also straw serving for the same vse.

A Campe ought not to be quartered too neere the Towne Beseiged, lest the Enemie may reach it, and doe great annoyance to it with his Canon, neither ought it to be quartered too farre of, but that one Quarter may with expedition relieve one another, as also those which worke in the Approches, if the beseiged should sallie out vpon them, therefore the furthest, and the neareſt distance for the better safety of the Campe, is to lie without Canon shot.

The Circumference, measure, greatnesse, and largnesse of a Campe, ought to be answerable to the greatnesse or littlenesse, of it: for one must not take a place too little for a great Armie, neither a place too great for a small Armie; for the one will not be able to defend the Campe; because of the smalnesse of it, and the other not able, and sufficient to defend a great place.

Finally, it is a point of great consequence for a Campe, to have all the *avenues*, and passages that comes to it well guarded, so that an Enemie cannot lodge neare it, to hinder the provisions and Victuals which comes to it, for want whereof many times an Armie is forced to rise.

A Campe then being endowed with all these *Proprieties*, no question but it is well settled. But seing that such places are seldome found, which answers to all these proprieties discribed above, one must accommodate themselves, according to the propriety of the place, and repaire that by Art, which is wanting by Nature.

If there being any hils, or *heigths* in it, you much Quarter, and lodge vpon them, when the nature of the place will afford it, or if there be any other commodious place neere vnto the Quarter, it ought to be taken in, and environned with a Trench, and a Redoubt made in it, and Ordinance planted vpon it. But this heigth being situated vpon a passage, or place of importance, a Fort is made vpon it in taking away, as much as possible may be all advantage from an Enemie.

The seige of the *Bosch* may give vs an example herein, where there was a heigth situated vpon the way, as you go to *Vliemen*, and towards the Longstrate, vpon the top of which hill, a foure square Fort was made with foure *Demy-Bulwarkes*, and besides a *Crowne-worke* before it, and before that as a surplus, there was made a *Horne-worke*, all which workes were nevertheless environned with the line of circumvalation, which encompassed the whole Armie: for the Enemie could hardly assault the Campe on this side, because the hill lay so, that it commaunded all the grounds about it.

When there is no River, then all necessaries, and provisions must be brought to the Campe by waggons, wherevpon care must be taken, that the waggonmen and Sutlars set not too high a price vpon their provisions, and Victuals, which might cause a Dearth and scarcity in the Army.

For the avoyding of stincks and noisome smels, the dead Carions of horses, and other Beasts ought to be carryed and buryed farre off without the Camp and Quarters, to which order also the Butchers are subiect, for the carrying away of the panches, and Entrailes of the Cattell which they kill, and to bury them in pits without the Campe.

The woods, thickets, and groves, which stand not farre from the Campe, ought to be taken in within the Trench, when it may conveniently be done with a small charge, which

wood and timber may ſerve for firing, and other good vſes. But when they lie too farre of, and cannot have all within the Compaſſe of the line of Circumvalation, which may be dammageable to the Campe, then they are cut downe, and burnt, leſt an Enemie might lay any *Ambuſcadoes* in them.

Alſo, having a water, or a river, which may be ſtopped by the Beſeiged; ſo that in time, it might overflow the Campe, one ought to take a ſingular care by hindring it, and caſting vp of ſome bank to ſtop it, and carry it about the Campe, to diſcharge it ſelf elſwhere, which neceſſity, and experience will teach one.

All theſe things then being maturely conſidered, and overweighed, after one is well informed of the nature, and condition of the ſoile, lying about the Towne, or Fortreſſe, which is to be beſeiged, and being come within two or three Dutch miles of that place, the Quartermaſter Generall before the Armie rides out with ſome 80, 100, or a greater number of Horſe, as neceſſity may require, to view the towne, or Fortreſſe to be beſeiged and conſiders well the ſoile and grounds that lies about it, and draws a draught and platforme of them, that he may the better diſtribute, and give out the ſeverall Quarters.

All Quarters are not alike over all, and of one and the ſame forme, but one muſt accommodate himſelf many times, according to the ſite of the place; for ſometimes one muſt content himſelf with one Quarter alone, and otherwhiles the Campe may be devided into two, three, foure, or many Quarters.

The Forme is alſo diverſe, ſeing one muſt governe themſelves according to the ſituation of the place, The largneſſe muſt be anſwerable to the number of the Regiments, which are to be Quartered, and which shal be handled in the next chapter.

THE

THE SECOND CHAPTER.

OF THE DEVISION OF HVTS FOR *Officers, Souldiers, and Sutlers.*

Together,

With the true meaſure and diſtances of them, according to his Highneſſe the Prince of Orange *his new Order for a Regiment, and for the quartering of the Captaines in the Reere, for the preventing of fire, and diſorders.*

BEfore wee come to the diviſion of the ground, appointed for the Quartering of a Regiment of foote, it will be neceſſarie to diſcribe firſt, how much ground, commonly a Companie of 120, or of a 150 and of 200 heades muſt haue, which may ſerue then as a Generall rule in the diſtribution of the quartering of ſeverall Regiments, containing diverſe Colours, and Companies vnder them.

Firſt for a Colours of 120 foote, there is ordayned three hundred foote deepe. But the bredth muſt be according to the number of the heades in a Compar y, which are ſome more ſome leſſe: For a Company of 100, or 120 heads muſt take vp 24 foote in bredth, that is, two rowes of Huts, and a ſtreet betwixt them, a Companie of 150 muſt haue 40 foote in bredth, to wit, three rowes of huts and two ſtreetes, and a Collonels Companie of 200 heades, requires 56 foote in bredth, that is foure rowes of Huts, and three ſtreetes, beſides the back ſtreetes, which are betweene Companie and Company.

As for Example, the *Quartermaſter* hath giuen him a *Paralellogramma* of ground, which is 300 foote deepe, and 24 foote broade for a Companie of 120 heades, which he devides thus, from the Lieutenants and Enſignes hutts downeward to the Sariants huts in the Reere, he giues 180 foote deepe for two rowes of huts, and as is ſaid a ſtreete of eight foot, which makes 24 foote in bredth as aboueſaid. Then there is a ſtreet of 20 foote between the Reere of the Sariants hutt, and the boughs of the Captaines hutt: next the Captaine hath allowed him 40 foote in depth and ſome 20 foote broad (becauſe a paſſage for the Souldiers muſt not be ſtopt vp) for him to build in, Then betweene the Reere of the Captaines, and the Sutlars hutts, there is a large ſtreete of 40 foote made for the paſſage of men and waggons, and for feare of fyre. And laſt of all, there is 20 foote allowed for the depth of the Sutlars huts, to wit, ten foote for the forepart of his hutt for eating and drinking in, and 10 foote for his Kitchin, and this is the diſtribution for a Companie, which muſt take vp (according to the Princes new order) three hundred foote in depth.

The bredth of a Quarter, is according to the number of the Heades of a Company.

In the depth of 180 foote for the two rowes of huts aboue mentioned, there may be made in each row, twentie or two and twentie Hutts with a diſtance of two or three foote betweene every Cabin, for the avoyding Eues-droppings and a little trench to receiue the Water made betwixt them.

The doores of the Lieutenants, and Enſignes Cabbins commonly opens towards the Front, and the Armes, and the Alarme place, but the Sariants towardes the Reere.

The Souldiers doores open oppoſite one to an other, that vpon any occaſion they may preſently draw out into Armes, all which parts shalbe diſcribed in the figure for a Regiment (of ten Companies) following.

HIS HIGHNESSE THE PRINCE OF *Orange* his new Order, and Forme for Quartering of a Regiment of ten Companies of Foote, to wit, the Colonels being 200, the Lieutenant Colonels 150, and the Captaines 120 Heads.

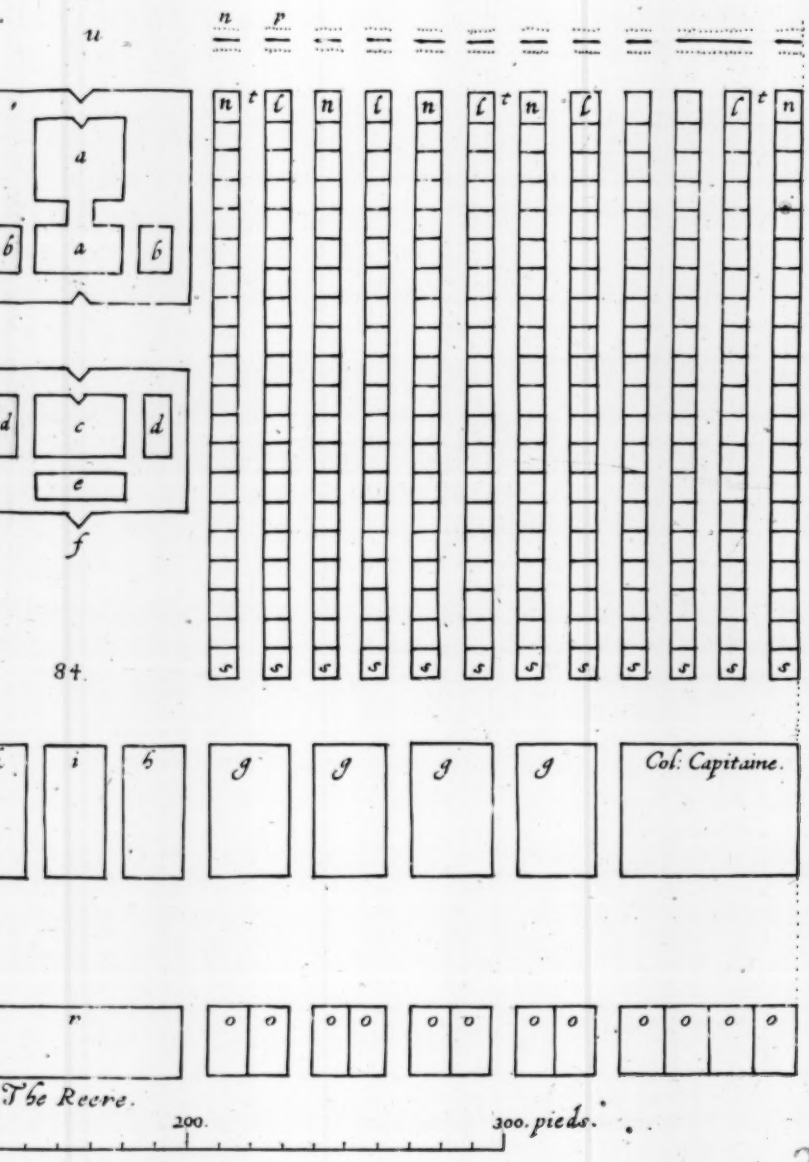
THE DEMONSTRATION.

A is the Colonels Hall, Gallerie, and Pavillion,
B are two hutts for his servants.
C the Kitchin.
D Two hutts for the Butlar, a Cellar and a pantrie.
E The Stable.
F A place for his Waggons.
G The Captaines hutts.
H The Quartermasters Hutt.
I The Preachers Hutt.
K The Chirurgians hut.
L The Lieutenants hutts.
M The Ensignes hutts.
N The crutch for the musketts.
P The Crutch for the Pikes.
Q The Alarme place, which is 200 foot between the head of the Quarter and the Trench.
R The Provost-Marshals hutt and Prison.
S The Sariants huts.
T The Backstreetes betweene each Companie.
V is 20 foote between the front and the furthest side of the Pikes.
The bredth of the whole quarter for these 10 Companies, is 436 foote.
The Coronells division, 84 foote.

THE

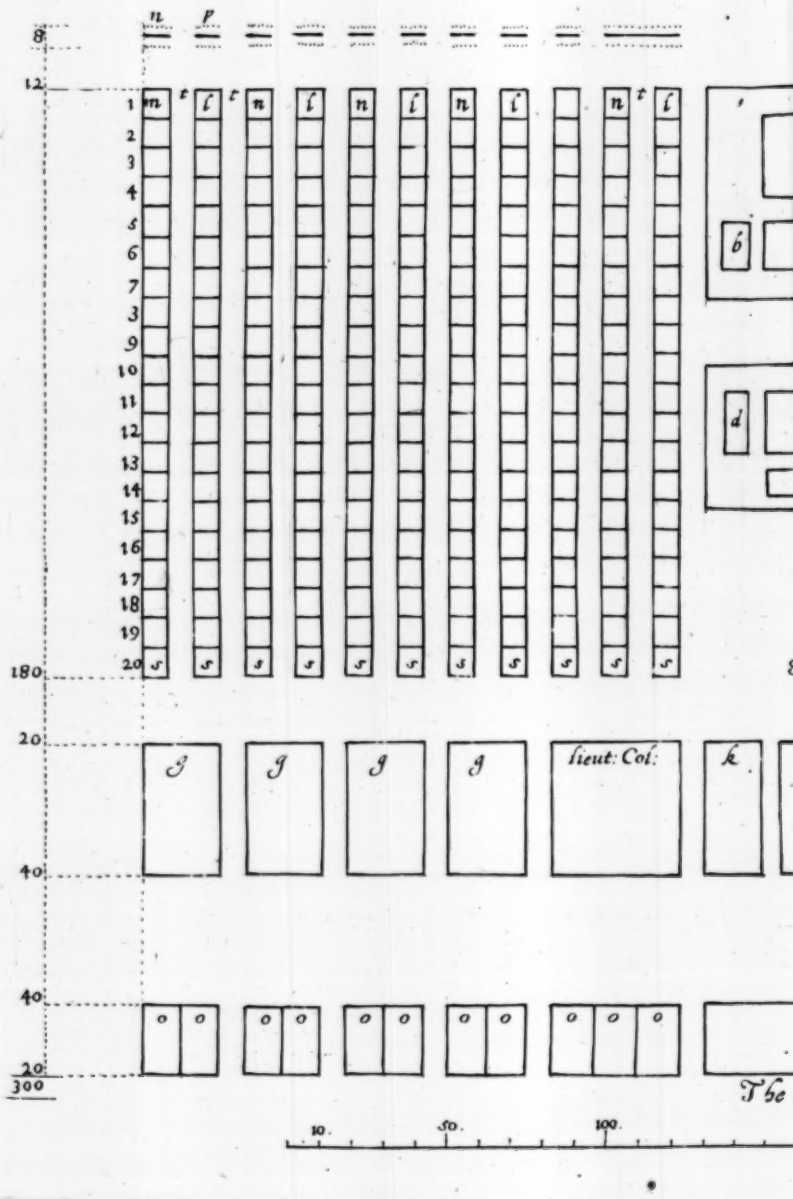
uiques, selon l'Ordre de son Altezze: le front á 434 pieds.

The alarme place 200 foote.



Quartier d'un Regiment d'Infanterie de dix Compaignie.

His Highnesse forme for quartereng of a = Regiment of ten Compaines: the front is 434 f.



THE FORME OF QVARTERING OF A *Regiment of Horſe, conſiſting of five Troupes, according to the Prince of* Orange *his new Order, the Captaines being quartered in the Reere.*

THE THIRD CHAPTER.

FOr euerie Cornet of Horſe, there is ordayned (as the foote are) a depth of 300 foote, the bredth is not alwaies a like, but muſt be given according to the greatneſſe, and ſmalneſſe of the number of heads, ſerving vnder the ſaid Cornet.

A *Cornet* then containing a hundred Horſemen, muſt have a place of 300 foot deep, and 70 foote broad, wherein they are to lodge, and content themſelves

The Captaines Hutt of the Troupe, with his boughes is 70 foote broad, and 40 foote deep, being a part of the depth of the 300 foot aboveſaid.

Betweene the Reere of the rowes of the Horſemens Huts, and the Captaines, there is a ſtreet of 20 foote, and the two rowes of the Horſemens Huts (as the foot is) is 180 foot deepe, to wit, from the Lieutenants, and Cornets Huts in the front, to the Quartermaſters and Corporals in the Reere, which makes in all two hundred foote deepe, and 70 foote broad, the room for the Huts in each row is ten foote, after which there is a ſmall ſtreete of 5 foote, in which the Huts have their doores, and commings out. For the Horſe there is a ſpace left of ten foote on both ſides, alſo betweene the two rowes of Horſe, there is a ſtreete of 20 foote broad, ſeing that the Cornet conſiſts of no more then of 100 Horſe, ſo that there are placed 50 Horſe in one row, and 50 in another, and every Horſe is allowed 4 foote in bredth, and 10 foote in depth, which is the ſpace alſo appointed for his Maſter.

Betweene the Captaines Hut, and the Sutlars, there is alſo a ſtreete of 40 foote for the ſame reaſon, as wee have diſcribed in the Quartering of foote. after which there is a place for the Sutlars Huts, which is anſwerable to the breadth of the Cornet 70 foot, and for the depth of his fore Hutt 10 foote, and for his kitchin 10 foote more allowed him, ſo that the true dimenſion for the Quartering of a Troupe of 100 Horſe, is 300 foote deep, and 70 foote broad.

But a greater Cornet conſiſting of 140 heads, (or it may be 150) then they have given them a row of Huts more, ſo that they muſt have in all three rowes, of which the laſt ſtanding alone, is ſeparated from the ſecond by a ſtreete of 10 foot, which reacheth from the hutts of the ſecond row, and the Horſe are ſet behind this new row, after which (as before) there is a depth of 10 foote for a Horſe, and a ſmall ſtreete of 5 foote, and for the Huts of the Horſemen likewiſe 10 foot, whence followeth, that the breadth for a Cornet of Horſe of 140 heads takes vp 105 foote, for the two rowes takeing vp 70 foot, if you adde therevnto the two ſtreets, the one of 10, and the other of 5 foote, with the diſtance left for the Horſe, and the Horſemen, makeing 20 foot, it is in all 35 foote, you ſhall then have the breadth of 105 foot for a Cornet of 140 heads, and the depth of 300 foot as before.

Note that euery Horſe hath his head ſtanding towards his maſters hut, that vpon any occaſion his Maſter may goe directly to his Horſe, without going about his hut.

The ſpace being deepe enough for the huts, they neede not build them cloſſe one to another, but leaue a little diſtance of a foote and a halfe, or two foote at the moſt betweene the Hutts: but betweene every fifth and ſixth hutt, there is an open ſpace left of ſome 6 or 8 foote, for the Horſemen to draw out of, if neceſſity ſhould require.

The Hutts which the Horſemen build, are built in the ſame manner as the foote are, ſaving that they take vp more roome, for the depth of the Hutts for the foote, is but 8 foote, and the Horſemen muſt haue ten.

The two firſt Hutts in the head of the Quarter is appointed for the *Lieutenants*, & the *Cornets*, and the two laſt in the Reere are ordayned for the *Quarter-maſters*, and the *Corporals*.

Before the Horſe, (between the Hutts and the ſtreets) there are mangers made for the Horſe with boords, or plancks faſtned and nailed together, which ſtand vpon poſts driven

into the ground, and have Sailes covered over them, from the one ſide to the other, and becauſe many Horſe are of ſuch a nature and condition, that they will not ſtand together, there are poſts tyed between them, that they may not ſtrike, and hurt one another.

Now if there be any likelihood, that it may prove a ſettled *Camp*, or *Leager*, then they may alſo build Huts for their Horſe, to keep them from cold and Sun. Theſe Huts are covered with ſtraw, as the Horſemens are, but are open before and behinde, (becauſe every Horſeman may have an eye to his Horſe) ſo that they are but onely covered over head on both ſides, which coverings are alſo made oftentimes with ſuch Sayles, as Tents are commonly made of.

But the Horſe being come to ſuch a place, are commonly lodged and quartered firſt in Villages, houſes, and barnes, if there be any thereabouts, at leaſtwiſe till they have built them huts for themſelves, and their Horſe. But finding no Houſes, Stables, and Barnes, or ſuch like accommodations for them, then they will be conſtrained to let their Horſes ſtand uncovered, till they have built their owne Cabins, which being done, then they may make their Horſes.

The *Ichnographie* of a Quarter for a whole Regiment of Horſe, *Harquebuſiers* and *Curaſſiers*, conſiſting of five Cornets, each of a hundred heads, ſhall be demonſtrated in the figure following.

THE DEMONSTRATION.

A D r s, is the Colonels, Sarjant Majours, and Captaines Huts, being 70 foot broad, and 40 foot deepe.

Li, and Cor, are the Lieutenants and Cornets Huts in the Front of the Quarter.

Qu, and C, are the Quartermaſters, and Corporals Huts in the Reere of the two rowes.

r a, c g, a Street of 20 foot, between the Quartermaſters, Corporals, and Captaines Huts.

a b, and g i, is the depth of 180 foote, for two rowes of Huts, from the Lieutenants, and Cornets Huts in the Front, to the Quartermaſters and Corporals in the Reere.

a k, b c, p g, and h i, is the breadth of ten foote for the two rowes of Huts.

k l, c d, o p, q h, is the ſtreets between the Huts, and the ſtables for the Horſe, being 5 foote.

m n, e f, is the great ſtreet of 20 foot, for the whole troupe to draw out in.

From b to t, is a large ſtreet of 40 foot, for feare of fire, between the Reere of the Captaines Hut, and the Front of the Suttlers.

C n, is the Suttlers Huts, that is, 10 foot for the forepart, and 10 foot for the afterpart for their Kitchins.

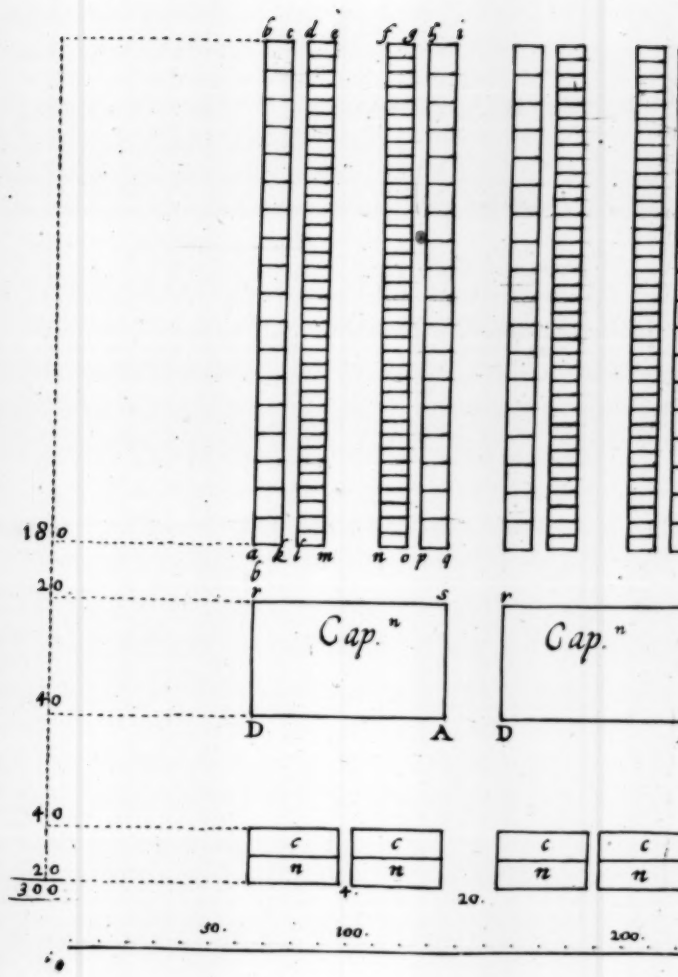
Note, that a Colonell of Horſe is allowed no more ground, then a Captaine of a troup is, onely this preheminencie he hath, to be quartered in the midſt, and if his troupe bee ſtronger, then a private Captaine is, then (as is aboveſaid) he is allowed him more ground, and another row of hutts, and thus much for the Quartering of a Regiment of Horſe.

Quartier d'un Regiment de Cavaillerie de s

le front

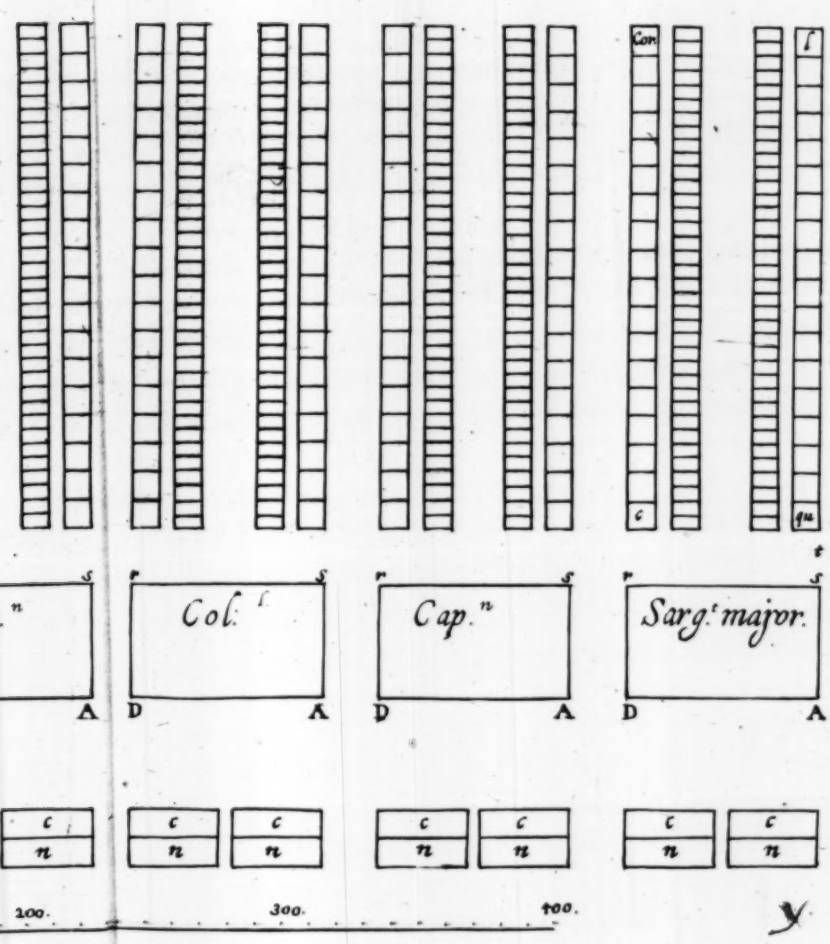
His Highnesse forme for quartering of a

The fron



é 5. Compaignies selon l'ordre de son Alteſſe.
ont á 430. pieds
f á Regiment of Horse, consisting of 5. troupes.
front is 430. foote.

The Marme place 200. foote.



Of Particular Quarters.

BEſides, the Quarters aboue mentioned, there are alſo Particular Quarters in a *Campe*, which ought to come into conſideration, to wit, The *Generals*, The *Generall of the Ordinance*, the Quarter for the Canon, Carriages, and waggons, as alſo ſome other Quarters, which ſhall be diſcribed as followeth.

The Generall hath a ſquare place of Ground giuen him, which as a Regiment is 300 foote deepe, and 600 foote broade, and his Tents and Pavillions ſett vp, and diſpoſed of as the *Generall*, and his *Tent-maſter* ſhall thinke fitting.

Alſo there is given to the *Generall of the Ordinance*, a depth of 300 foote, and a bredth of 480 foote for him, and his traine of Ordinance, Officers, and Handie crafts men to Quarter in, hauing a little trench caſt round about it.

In which ground alſo, is built a foure ſquare Redoubt with haire cloth ouer it, to laye in powder, and Fireworkes, for feare of fyring, and to keepe them from wetneſſe, and rayne ſeing they are not ſo combuſtible and will not take fire ſo ſoone, as ſtraw, or ſailes will.

There is alſo a place ordayned of 300 foote in bredth, and depth for ſome chiefe Officers of the feild, which are not lodged within the Regiments.

The waggons alſo haue a certaine place giuen them, that they may giue noe hindrance to the *Campe*. The depth is alſo commonly 300 foote, but the bredth muſt be anſwerable to the number of waggons.

The *Market place*, where Marchands, victulars, Tradſmen, Butchers, and Bakers are lodged have a depth alſo of 300 foote giuen them, and is ſome 400 foote broad, in the midſt whereof there is an open place left for the market place, and the ſides are divided into rowes of hutts and ſtreetes. They make ordinarily eight rowes of hutts, whereof foure are ſett upon the one, and foure vpon the other ſide, every hutt being ten foote broade, and betweene every two rowes of hutts, there is a ſtreete left ſome 20 foote broade.

The firſt two Rowes of hutts next to the market place, are appointed for *Mercers* wollen and linnen Drapers, and ſome other choiſe wares. The Tavernes, and Ordinaries takes up the ſecond, the third are for handicrafts men, and the fourth for Butchers, and Bakers.

There is likewiſe a vacant place left for the lodging of *Voluntiers* and *Strangers*, which hath noe certaine meaſure, but muſt fall out, ſometimes more and ſometimes leſſe as occaſion ſerves, and this is the deſcription of a quarter, or *Campe*, both in generall and particular, as neere as may.

The Ichnographie of a Campe.

THE FOVRTH CHAPTER.

THe *Quartermaſter Generall* makes firſt a Scale, which will ſerue for a sheete of paper, fitting it according to the proportion, as the ſaid paper will beare, either greater or leſſer, and then makes a draught vpon it. According to the meaſure of this Scale, he drawes out vpon this, ſome *parallell* lines of 300 foote deepe, which shewes the depth of every quarter, with ſome other *parallell* lines of ſome 50, 80, or 90 foote, as the ground will afford, and the diuiſions betweene Regiment and Regiment.

Afterwards he marketh upon a paper, euery one of the ſaid quarters, and Regiments a part, according to the proportion of the ſame ſcale, as one hath drawne the lines aboue ſaid, and then cut it of ſoe that they haue all one depth of 300 foote, and the bredth according to the liſt of the number of the Companies of euery Regiment, and how many foote euery Regiment and quarter will take up. It were better to take a peece of paſt board paper & then make & cut out alſo vpon the ſaid paper, the depth the bredth, and the name of the regiment the Colonell and perſon to whome the quarter belongs; doing the like in all the other quarters. Theſe littles papers being ſo cut and ordered, one may put and lay them again upon the paper with the *parallell* lines aboueſaid, euen till they he laid according to your deſire, and let them be as they are fitted. One muſt nevertheleſs have a care, that the Generals quarters be in the middeſt, and that there bee a conuenient ſpace without his quarter, aſwell before, as on both ſides, as the figure following will showe marked with the letter A, where the Generall is lodged in the midſt of the Campe, and the bredth of his quarter, according to this ſcale is 1250 foote, and the depth as is ſaid 300.

The quarters are ſeparated one from an other by ſtreetes, and diuiſions ſome leſſe ſome more, as the ground will giue it, as ſomewils 500, therwhils 80, 92, or 100 foote betweene quarter and quarter, as you may ſee in the figure following.

Finally the quartermaſter Generall takes firſt the bredth and depth of the whole qnarter, and Campe, and draws it ought (as is taught) upon a paper. The bredth here takes up 3000 foote and the depth 2000.

The draught of the campe being drawne upon a paper, and the whole quarter deſigned, it will be eaſie then to lay them out in the field.

How one muſt marke and lay
out the quarters in a field.

To this end, the *Quartermaſter Generall* hath a chaine divided into *Rhyn-landish* foote & Rodds at 12 foot the rodd, & an inſtrument vſed in fortification, or at leaſt a wodden croſſe with foure right angles, and a good number of Beackons with banroles vpon them, called *quarter beackons*, whereof the ſtaues are painted, and are ſome nine, or ten foote long, and ſets vp one of theſe beacons vpon the angles of every quarter.

Being come into the field, in which he is reſolued to encampe the Army, firſt he layes out the circuit of the Generall quarter, with foure exteriour lines in ſuch ſort, that every corner of the quarter makes a right angle.

After one hath meaſured out the foure lines aboueſaid, he ſets vp foure quarter Beacons, and then begins to lay out euery quarter a part, according to the proportion, which he hath marked in this paper: but to the end one may not err, he puts vpon the little cut paper the number of euery quarter, with which alſo the Beacons are marked, by which meanes the ſame quarter is bounded in the field, and the number is painted, or cut upon the Beacons. It will not be amiſſe, to haue alwayes foure of them of one number, which may eaſely be known by the Beacons, in caſe they were all of one coulour. All which is demonſtrated in the figure of a Campe where the Beacons are ſet up, and noted with the figures 1, 2, 3, & 4.

The duty of a Quartermaſter of a Regiment.

AFter all this is done, and euery particular quarter drawne out in the feild, euery quartermaſter diſtributes the ground to the Companies of his Regiment, according to the *Ichnographie* of the figure of 10 Companies showne before for a regiment; In laying out of his quarter, he vſeth a line of 300 foote long and every eight foote is marked for the depth, and bredth of the huts and ſtreets, ſticking downe into the ground at euery eighth foote a bough, or ſtick, aſwell in the front as in the reere of the quarter, giuing alſo to the Colonell his ground in the midſt of his regiment. But firſt the quartermaſters prikes out the ground before and behinde for the Captaines, & giues there the bredth of the ſtreete between the Sarjants in the reere of the ſouldiers huts, and their owne as likewiſe the depth, betweene the Captaines boughs the Sutlars huts, marking out firſt the foure angles of his quarter, by ſetting into the ground his quarter ſtaues and flaggs of his Colonels colours.

The duty of a Sarjant.

THe quarter being ſo laid out, then the Sarjant of euery Companie kilſpits it, and diuides and makes the partition of the huts to the Gentlemen and ſouldiers, which they prick out by line and ſmall boughs, or ſticks ſtock into the ground, and ſo diuides the rowes of huts and the ſtreets among them, euery hut hauing ſome 4 or 5 foote in bredth, and for vniformity ſake 8 foote deepe, and thus the ground for a whole Regiment of what number ſoeuer the Companies be, is marked and drawne out in a feild, as the figure of a Regiment for 10 Companies before mentioned demonſtrates.

The other quarters to wit, for horſe, officers, ordinance, and carriages are marked by number and letter in the Campe following.

The Alarme place.

THere is left round about the circuit of the whole quarter, a *parallell* on all ſides ſome 200, or 250 foote betweene the front of the quarter and the trench, called *an Alarme Place*, for the ſouldiers to draw out into Armes, into *Paxade*, or when any *Alarme* or commotion happens, the *Campe* or quarter being enuironned with a Trench, and a Parapet of ſix foote high, ſix foote deepe and three foote in the bottome, and the ditch 8 foote broade.

The ſouldiers of euery Companie are commonly commanded to make this trench, parapet, and ditch before their quarter, or where it may fall out, becauſe it ſerues for their own defence, which the ſouldiers are to doe, for their owne fafty, without giuing them any mony for it.

There is aſſigned by the quartermaſters to euery Regiment, how much ground they muſt caſt vp, according to the commiſſion and ſtrength of euery company, which proportionally is equally diuided among the companies, that one companie do no more work then an other. In doing of which, the Captaine and officers of a companie are to ouerſee it, that the trench be done well and with expedition. Now the whole circumference of the quarter, being meaſured out by line, and *kilſpitted*, there is a generall *calculation* made, how many Regiments there are in the Campe, and how many companies each Regiment hath, that one may know how many hundred companies there are in the army. And then by the rule of 3 (knowing the line and circumference) and the number of companies, ſay, the number of all the Regiments, and compagnies which are to make up the line of *Circumvallation*, amounts to ſo many feete, or rodes, how much ground then muſt a Regiment of ten companies haue that containes ſo many men. This *calculation* being made, the companies of euery Regiment draw out ſo many men, after the quartermaſter hath furniſhed them with materials, which is quickly done, ſeing the men are relieued, and many hands (as the proverbe is) makes light worke, and will make haſt, that they may haue time to build their own huts and cabins to keepe them vnder covert.

The quarters being thus fortified, and the line of *Circumvallation* made a double ditch for horſes and ſtrong *Redoubts*, *Horne-works*, *Crowne-works*, *Batteries*, *Half-moones* and

Spurs upon the commanding places of moſt danger (as your shall ſee in the *Ichnographies* of the lines of Circumvallation before the ſiege of the *Boſch*, *Maſtrick* and *Breda* which shall be shown (God willing) in my third part of this booke, all theſe things then being done, after the demonſtration of this Campe, we come next to handle approches.

THE DEMONSTRATION OF THE ſeverall Quarters in this Campe.

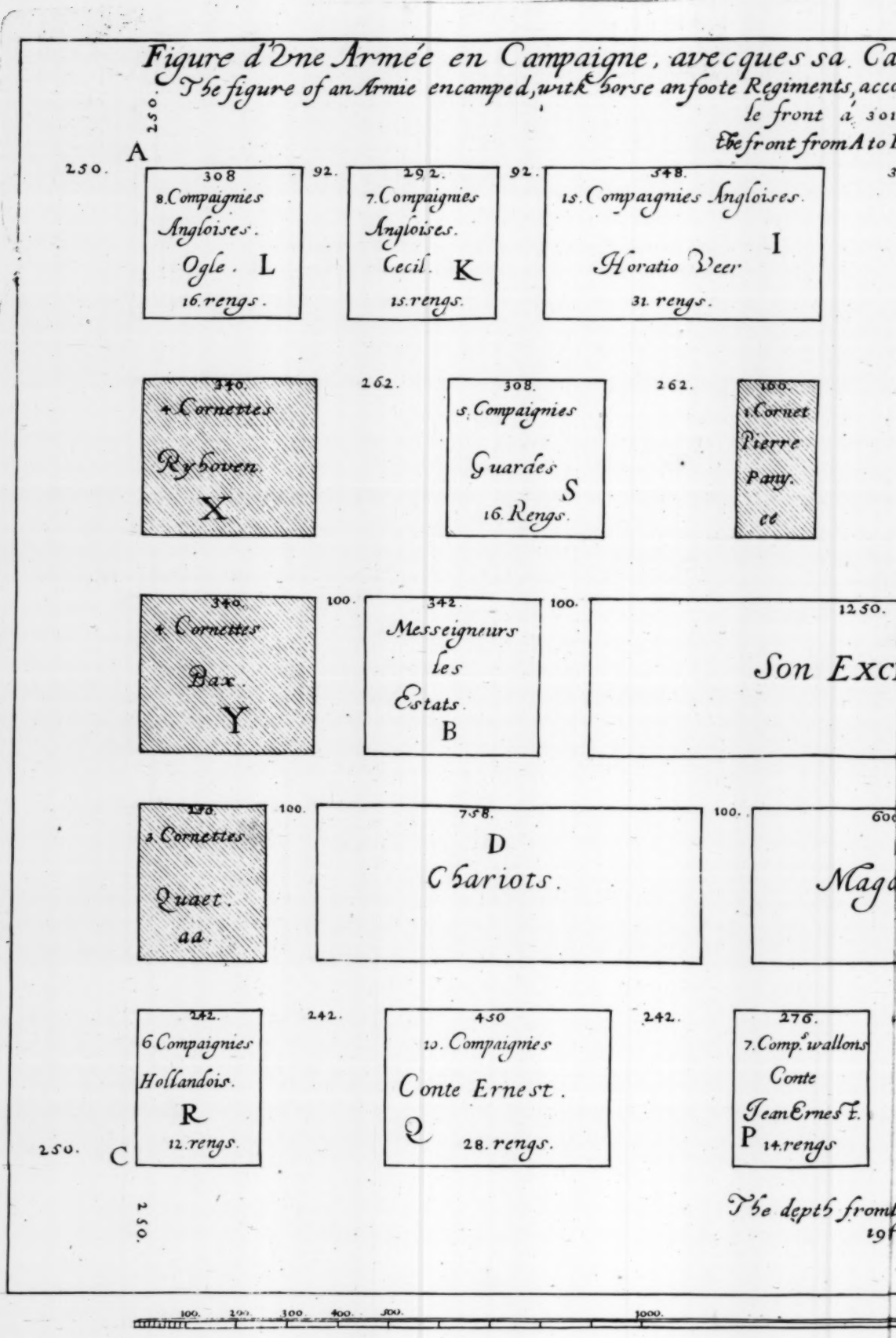
A is his Excellencies quarter, which is 300 foote in depth and 1256 in bredth.
B is the Lords the States quarter being 300 foote in depth and 342 in bredth.
C the Generall of the ordinance and Magazin 300 foote in depth and 606 in bredth.
D the quarter of the Carriages and waggons.
E the quarter for marchants, tradſmen and victulars.
F Monſ. Chaſtillon quarter being 14 Companies making 28 Rowes of huts 300 deepe and 500 foote broade.
G Monſ. Bythunes being 13 Comp. making 28 Rowes 300 foote deepe and 500 in bredth.
H the Freeſes being 5 Comp. making 15 Rowes 300 foote deepe and 235 foote broad.
I Sir Horace Veres Regiment being 14 English Comp. making 31 Rowes 300 foote deepe and 548 broad.
K Monſ. Cicils Reg. being 7 Comp. making 15 Rowes 300 foote deepe and 292 broad.
L Colonel Ogles Reg. being 8 Comp. making 16 Rowes 300 foote deepe and 308 broad.
M Monſ. Fulchs being 6 Comp. 18 rowes 300 foote deep and 340 broade.
N My Lord of Bach-louch being 6 Comp. 12 rowes 300 foote deepe and 244 broade.
O Colonel Egmont his Reg. being 6 Comp. 12 rowes 300 foote deep and 244 broad.
P 7 Comp. Wallons commanded by Count John Erneſt 14 rowes 300 foote deepe and 276 broad.
Q Count Erneſt Lord Marshall 10 Comp. 25 rowes 300 foote deep and 450 foote broade.
R 6 Comp. of Hollanders 12 rowes 300 foote deep and 242 broad.
T Prince Henry Generall of the horſe 4 Cornets 300 foote deep and 476 broad.
V Capt. Qwicht 3 Cornets 300 foote deepe and 250 broad.
W Monſ. Marquet Lieut. Generall 4 Cornets 300 foote deep and 340 broad.
X Monſ. Ryhoven 4 Cornets 300 foote deep and 340 broad.
Y Monſ. Bax 4 Cornets 300 foote deep and 340 broad.
Z Monſ. Wagheman 3 Cornets 300 foote deepe and 250 broad.
aa Monſ. Quaet 3 Cornets 300 foote deep and 350 broad.
bb Monſ. la Sale 4 Cornets 300 foote deep and 340 broad.
cc Monſ. Stakenbrouk 4 Cornets 300 foote deepe and 340 broad.
dd The Droſt Sallant 4 Cornets 300 foote deep and 340 broad.
ee Peter Pany crmmanding the Princes guard of horſe 1 Corn. 300 foote deep and 100 broad.

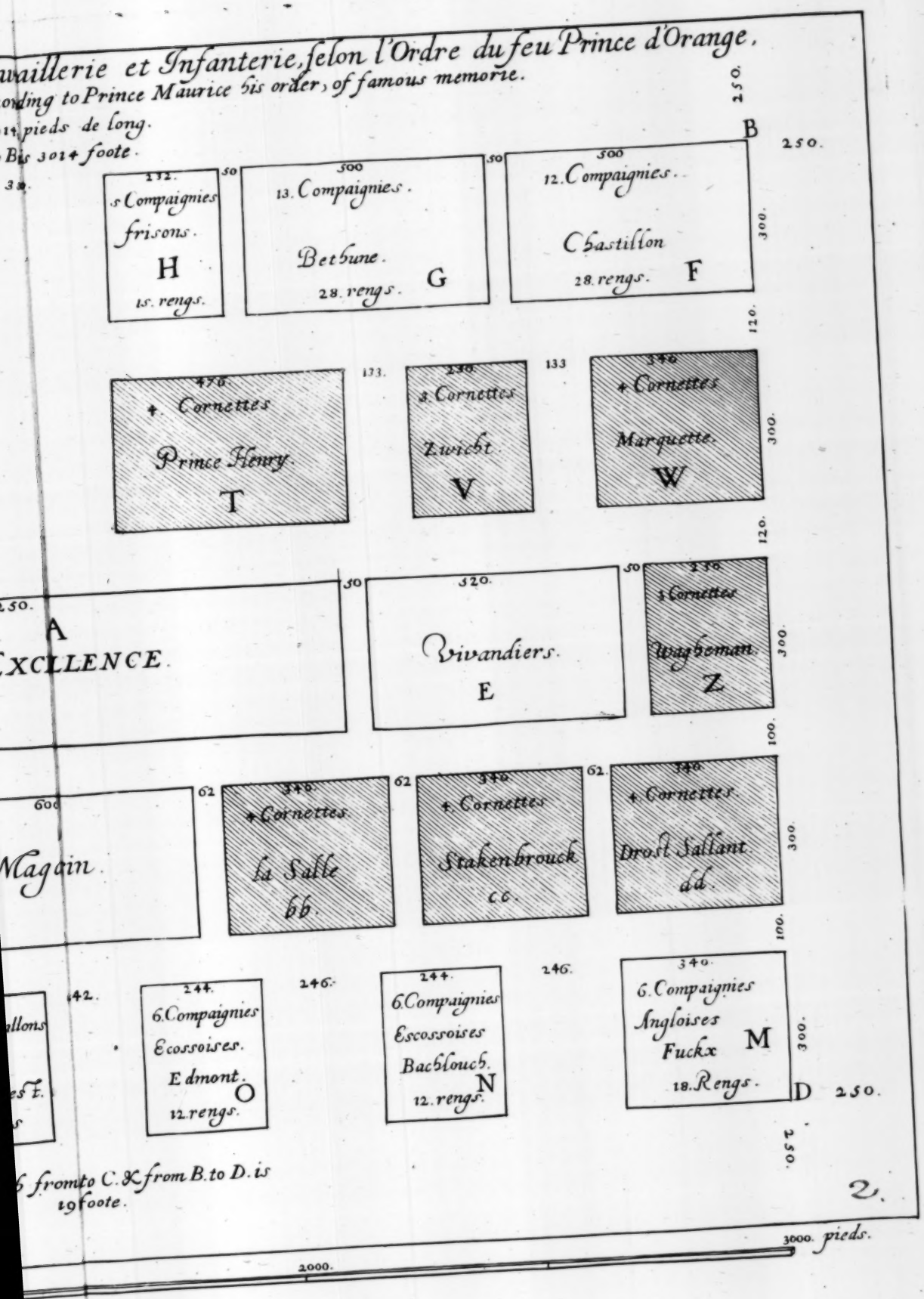
Figure d'Vne Armée en Campaigne, avecques sa Ca

The figure of an Armie encamped, with horse and foote Regiments, acco

le front à 30

the front from A to





...vaillerie et Infanterie, selon l'Ordre du feu Prince d'Orange,
...ording to Prince Maurice his order, of famous memorie.
...14 pieds de long.
...Bis 3014 foote.
B
250.
232.
5 Compaignies
frisons.
H
15. rengs.
50
500
13. Compaignies.
Bethune.
28. rengs.
G
50
500
12. Compaignies.
Chastillon
28. rengs.
F
300.
120.
476.
4. Cornettes
Prince Henry.
T
133.
230.
3. Cornettes
Zwicht.
V
133
340
4. Cornettes
Marquette.
W
300.
120.
250.
A
EXCELLENCE.
50
320.
Vivandiers.
E
50
230.
3 Cornettes
Wagheman.
Z
300.
100.
600
Magain.
62
340.
4 Cornettes.
la Salle
bb.
62
340.
4. Cornettes
Stakenbrouck
cc.
62.
340.
4. Cornettes.
Drost Sallant.
dd.
300.
100.
...allons
...es T.
...s
142.
244.
6. Compaignies
Ecossoises.
Edmont.
O
12. rengs.
246.
244.
6. Compaignies
Escossoises
Bachlouch.
N
12. rengs.
246.
340.
6. Compaignies
Angloises
Fuckx
M
18. Rengs.
300.
D
250.
250.
...h from to C. & from B. to D. is
19 foote.
2.
2000.
3000. pieds.

OF ALL MANNER OF APPROACHES, AND *their Profiles, with the definition what approches are.*

THE FIFTH CHAPTER.

THe Approch by which one approcheth ſafeſt towards a Towne, or a Fortreſſe beſieged, are certaine hollow ditches, called *Trenches* digged into the Earth, whereby one may approch neare vnto a Towne, or a fortreſſe covertly, without any great harme, if the lines be carryed well, and kept from the ſight of an enemy.

In approching one ought to conſider well; 1 *The ſituation of the Towne or fort to be beſieged.* 2 *The propriety and forme of the approach.* 3 *The beginning and diſtance of them, and fourthly their profile.*

1 For the Site of the place, one ought to conſider well the propriety, and nature thereof, whether the ground bee high, low, hilly, or plaine. In plaine and even ground, one may finde foure kinds of Earth, to wit, 1 a Clayie and a ſolid Earth, 2 Sandie, 3 a Spongie and rotten earth, & 4 moorish and a marchie ground which may bee covered and lie vnder water, hauing no firme foundation to work vpon. Secondy, hilly places whether they have a ſolid foundation, 3 Sandie, and 4 Stonie. Alſo one muſt take into conſideration; the Forreſts, woods, wayes, ditches, hills, and ſuch like things, as may lye round about it, or go towards it.

Of foure manner of Approches.

FIrſt, if one cannot make choiſe of ſuch ground, as they deſire, then one muſt take it as it fals out, whence there follows diuerſe manner of Approches; for, if it be good ground, then they run their lines directly from the left hand to the right, and from the right hand to the left, continuing it *alternatively* till you come to your diſtance deſired, the half of which trench is digged into the Earth, and the other halfe caſt up with a *parapet* raiſed vpon it, which ſerues as a blinde to keep your men from the ſight of an enemy, and thus you continue your approch by windings and turnings, till you come to the *Counterſcharfe*, and moate of the Towne beſieged, and this kinde of approach you vſe in good and firme Earth.

The ſecond kinde of Approach is that, which is made in a *Sandie ground*, which you may run in the ſame manner with windings, and turnings as you did the firſt, ſaving that your *parapet* will not hold with ſand, and therefore, becauſe Sand is not ſo good to work upon, and will not lie ſo firme as other Earth doth, but will coſt more labour, and require more time then ſolid Earth, therefore one muſt approch neerer and neerer by ſetting vp of Gabions.

The third way hath another difference, then theſe two abouementioned, for ſometimes one may finde good Earth, and Sandie mingled together, yea, and ſomewhiles a *Marras* on both ſides, in ſo much that one ſhall haue but a narrow way, through which one is to carry his approch, and as in the former you cannot run your lines from the left hand to the right, or from the right hand to the left, ſo in this you are driuen to run a line directly vpon the Towne or Fortreſſe beſieged.

Now this manner of approach carried in a right line, is not ſo labourſome and chargeable as the others before-named, which are run with *oblique lines*: but the greateſt labour is, ſuch an Approach muſt be made deeper, then the former, & do require a double trench and *parapet*, whereas the others haue but a ſingle one, and euer and anon there muſt be blinds ſett vp becauſe this kinde is more dangerous, and in this approch the one half of the Earth is ſett up with a parapet on the one ſide, and the other half on the other ſide.

The Appproch which is made through moorish, and marchie grounds ouerflowne, is almoſt impoſſible, by reaſon of the inconſtancie of the water, which riſeth, and falleth according to the ſeaſon, and which cauſeth many inconueniences: for when one expects dry

ſeaſon, the weather may alter and proue rainie and ſtormie, which may not onely hinder the approch begun, but alſo fill the trenches with water, therefore in ſuch caſes, one muſt accommodate themſelves, according to the weather, and vſe the wiſedome, and experience of Inginiers herein, for the preuenting of theſe inconveniences.

As the half of an ordinarie approch, is digged into the ground, ſo the other half is caſt vpon ground: this kinde being made over water and *Marras*, having no firme foundation, the foundation of them is layd by filling vp the water with bundles of Boughs, Brush, faggots, and ſuch like things, hauing Earth caſt upon them, to ſettle them, and make them lie faſt, and the Earth being brought upon wheelebarrowes from ſome other place, a *parapet* is raiſed, and blinds ſett up, that the workemen, and ſouldiers may work and be in more ſafety, which guards it.

The fourth difference of approch, is alſo made by Earth brought from ſome other places, having *Fagots*, *Brush*, *Bavins*, and planches layd vpon it, with *parapets* and blinds ſett vp.

Fifthly, having want of good Earth, and finding great ſtore of Sand, then the parapet muſt be made with *Gabions*, and Cannon Baskets filled with Earth.

The ſixth & laſt manner taketh its originall from the former, and is made with Redoubts in joyning the one to the other.

And if your meete with a ſtonie place, then you muſt help your ſelf with *Gabions*, & fetch your Earth from ſome other place, as you did in marchie grounds.

Theſe are all the ſeverall kindes of Approches, that we have mentioned here in this Chapter, which one cannot make without difference & judgement, becauſe the one is more laborious, and dangerous then the other, as we have taught.

But to the end all inconveniences may be avoided, one muſt firſt informe himſelf well of the nature of the place, through which one is reſolved to run an approch, and take a ſpeciall care, that no errour and faults be committed through ignorance, which may looſe time expence and labour, and may croſſe the happy ſucceſſe of an Armie, for it were an abſurd thing, if one ſhould make that approchin a moorish ground, which is to bee made in a plaine place, where there is good Earth, where one hath elbow room, and ſpace enough to run oblique lines, or when one would make them above the ground, when there is Earth enough to be digged out of the ground and caſt vp.

Beſides, one ought to conſider well, the diſtance of the firſt breaking of ground, between it and the Towne or Fortreſſe to be approched to, that one begins not too neere, nor too farre off, for the beginning of the Approches being too farre from the Fortreſſe, one looſes both time and paines, when one begins to breake ground from a place which is in ſafety.

On the other ſide, to begin an approch within the ſight of an Ennemie, one cannot ſo well defende himſelf from musket ſhott, becauſe the Muskettiers may take a furer marke, then when they ſhoot at *Randum*, and it will be hott for the workmen, before they can gett into the ground, beſides the workemen cannot be ſo well ſeconded, and relieved without great danger, eſpecially if the beſieged ſallies out, and gives them hott *Alarmes*, ſo that they muſt be preſently, relieved, or elſe they will be driuen to quit the approches and to retire, if they be not ſeconded betimes.

The diſtances betweene the beginning of an Approch, and a Fortreſſe.

HEnce one may clearely vnderſtand, the diſtance of the Approch to the Towne or Fortreſſe beſieged, and the place where one begins to breake ground firſt, ought to be as farre, as a musket can well carry from the outworks of the Fortreſſe, which may be about ſome 90, 80, 70, or 60 rod at 12 foote the rodd, or as the nature of the place will afoard it.

The

The beginning of an Approch. or firſt breaking of Ground.

When one would begin an Approch, there muſt be choiſe made of 200, 300, 400, or 500 luſty ſouldiers, which are vſed to work, now beſides the ordinairies armes, which they carrie, they take downe along with them into the approches ſpades, shovells, pickaxſes, and others materials neceſſary for work, and are ſet in order by the Ingenier in that place, where the Approch begins, and to the end they may begin with the more ſafety, they have diverſe *guards* of Foote, and horſe ſtanding up and down, here and there to defend them, if the beſieged should ſally out vpon the Workemen, and becauſe they may make a good beginning, firſt they caſt up a *Redoubt* or two, from whence the trench & approch is run, which are environned with a parapet, & a good ditch, and the ſides of the redouts made ſome eight rods ſquare, as you may ſee in the profile of trenches.

Indeed, ſometimes as occaſion may ſerue, they make *demy Bulwarkes*, or it may bee *Whole Bulwarkes*, for which one takes a *Profile* anſwerable to the greatneſſe, for when they are little, one makes vſe onely of the *Profile* of ordinaire trenches, and when they are great their *Profile* muſt be likewiſe correſpondent vnto them.

Theſe workes and Redouts ſerve for a Retreat to the Workemen, if an Enemy should make a great ſallie vpon them: for being retreated into the ſaid *Redouts*, they may reſiſt an Enemie, and ſtopp them, till they are ſeconded, ſo that ſuch *Redouts* are very neceſſary. For if the workemen had not a place to retreate into, they would be forced to betake themſelves to their heeles, and to abandon and looſe their worke.

But the *Ingeniers* which are employed therein, ought to vſe all the skill, induſtrie, and experience they have to run their lines in ſuch a ſort, that thoſe which are in the trenches and approches may not be diſcovered and ſeen by an ennemy. In a word, they may runne their approches with the more ſafety, and as much expedition as poſſible bee towards the place, or part of the Fortreſſe, which the *Generall* deſires to become maſter off.

There are two principall parts in a Town or Fortreſs, one of which muſt be battered, if one is reſolved to take it in, and that is, either a *Curtaine*, or a *Bulwarke*.

What part of a Fortreſſe ought to be approched to.

IT is not good to approch to a *Curtaine*, which is defended by the two next Bulwarkes, and their flanckes, when you are to expect an enemies Canon continually on both ſides of you, eſpecially, when you would give an aſſault vpon it; for afterward it may eaſely be cut off. Beſides that the moate is broader before the Curtaine, then in other places, whence it followeth manifeſtly, that there is no advantage in approching vpon ſuch a place.

But a *Bulwarke* is the ſafeſt, and beſt to be approched to and taken in: my reaſons are theſe, firſt the moate is not ſo broad and large, as it is before the *Curtaine*, and a Bulwarke hath but a ſingle defence, coming from the Bulwark oppoſite to it, which may be better beaten upon by Batteries then the Curtaine can. Moreover, a Bulwarke hath but a little defence of it ſelf, becauſe on may be forced to retire from it, and to make new workes, and cuttings of behinde that part which is quitted. And becauſe there is no ſo much ſpace, as is within the curtaine, the fortification thereof is more painefull and more incommodious, and therefore it is better to approach towards Bulwarkes, then curtaines, which is found by practize, and daily experience.

There are other works belonging to a Town, or Fortreſſe, as (*Crown-works*, *Horn-works*, *Tenailles*, *Ravelings*, *Halfe-moones*, and others. The manner of carrying of approches wilbe cleare and eaſie enough, when wee come to shew an approch by figure vpon a Towne or Fortreſſe which is to be taken in.

After one hath maturely reſolved, whether he will run an Approch vpon a Curtaine, or a Bulwarke. The Ingenier being preſent at the breaking of the ground, is to shew & informe the workemen well, how they are to run their line, and as neceſſity requires, being of diverſe lengths, but moſt commonly ſome 20, or 40 rod long, or ſometimes shorter or longer,

and broken and turned as often as is neceſſary. The line then being laid out and marked they divide and place the Workemen in order, that they may not hinder one another.

Now they giue to euery man the length of foure or fiue foote, and every one maketh as much haſt as poſſible may bee, to gett into the ground, for the avoyding of the danger whereunto he is expoſed, while he ſtands vpon the open feild, therefore the Earth which he diggeth he caſteth it vp before him, and with all expedition maketh a hole like a graue: it is needleſſe that at the firſt breaking, the ditch should be any broader or deeper then three foot, for the Earth being caſt vp three foote aboue the Ground, and the ditch likewiſe three foote deepe, a man then hath covert enough.

The Workemen then being got into the Ground, they enlarge and deepen the Approches as neceſſity requires, but thoſe which are fardeſt of from the Towne, they need not be ſo deepe at the beginning, as when they come neerer to the Fortreſſe. The bredth of the Approaches ought to be ſome 10 or 12 foote broad, as may be found neceſſarie: yea, ſometimes one is conſtrayned to make them larger, leaſt they might be too narrow, in regard waggons may be driven through them with materials neceſſarie for the Gallerie, as alſo Canon which muſt be drawne downe, and mounted vpon the Batteries.

But by how much larger the Approches are made, by ſo much ought the parapet of the Trench to be heightned, that the Enemie may not diſcover the Souldiers that are in them.

Eſpecially one ought to heighten thoſe points, and windings, where the Line turnes, otherwiſe it may proue very hurtfull and dangerous.

While the Souldiers are buſied in makeing of the Line, others are employed in makeing of a Batterie, to hinder the Enemie from Sallying out.

When the night is paſt, there are fresh workemen ſent downe to relieue the firſt, and to enlarge, heighten and repaire that nights worke, vnleſſe ſome of them are willing to continue their worke, and theſe commanded men, are to haue ten ſtivers a peece, which the Quartermaſter of every Regiment, who delivers the matterials doth ſolicite for and payes them.

After the firſt nights worke (or it may be the ſame) there are *Corps de guard* made, to putt a good number of Souldiers into, where they keepe their *Maine guard*, which are made ſometimes within the lines, with which the *Corps de guard* ought to be *Parallels*, or elſe vpon the point where the line turnes, and ſometimes without the Approches, to which the *Corps of guard* are ioyned to them by a line of *Communication*: ſo that they lie three or 4 Rod from them.

It is not alwaies needfull that theſe Redoubts be made ſquare, but one may make them *long-wiſe*, or elſe with 5 *Angles*, and after diverſe other manners, as the Ground will beſt afford.

Moſt commonly one workes by night, that they may receiue the leſſe harme, and that the day following the worke may be repaired.

When one line is finished as abouesaid, and that it muſt be run no further that way, the *Inginier* turnes the line another way, (bearing it from the Towne or Fortreſſe) and placeth the Workemen in order as abouesaid, in continuing ſo by windings, and turnings, till he hath gott ſomething neere vnto the Fortreſſe beſeiged, and makeing good the Line continuly with *Corps de guards* and Batteries.

But the neerer they approach vnto the Fortreſſe, the more ſubiect they are to danger, ſo that their pay is encreaſed every day, as the Approach is advanced, ſeing they hazard their liues for it, they haue a halfe Rixdaller a night, ſometimes a whole Rixdaller other-whiles a Rixdaller and a halfe, yea ſometimes ten Rixdallers for an howers worke, if it be very dangerous.

Finally when you are approached with your trench ſo farre that you are continually in the ſight of an Enemy, and where you cannot get any more ground, but with great danger, they make vſe then with an other manner of digging, or an Approach called commonly a *Sapp*, which is made in this manner following.

When a reſolution is taken, to approach vnto a *Curtaine*, or a *Bulwarke*, you run a right line

line vpon that place, which you intend to aſſault: as for example, ſuppoſe it were upon the *Demiface* of a Bulwark, in ſuch ſort, that it lies without the flancking blowes of the Fortreſſe.

A man then kneeling vpon his knees, diggs to get into the Ground and caſts vp the Earth before him on both ſides, with a short ſpade towards that part of the Fortreſſe, till he hath digged three foote into the Ground, and that hee is covered with the Earth, caſting alwaies the Earth like a moald before him towards the Towne, and on that ſide, where the moſt danger lies, he ought to caſt vp the Earth ſo high that it may be able to shelter thoſe, which comes to repaire and make the Sapp larger. After the firſt man which makes the Sapp is got into the ground and covered with earth, he advanceth forward and continues the Sapp, till he hath got ſome ſix foot, and then follows another Sapper preſently, who repaires and enlargeth the ditch to the bredth of ſix foote, while the other advances forward three foote further in bredth, and got ſo deep, that he is alwayes covered with the Earth, which he caſts vp before him, and the other follows him continually enlarging the ditch from three foot to ſixe. After him comes a third man, which finiſhes the whole Sapp, and gives it the conuenient height, depth, and bredth anſwerable to the firſt approch. But one muſt have a ſingular care, that the approches and Sappes bee not digged ſo deepe, as that water may riſe in them, but that they may alwayes remain dry vpon firme ground, which the condition of the ditch wil shew it: For when the water within is very deep, and the declination high enough, one may make the Approches as deepe as the ditch, when the water that is in it, is diſtant from the plaine Earth.

Touching the manner of Working, an Agreement is made with certaine workemen, becauſe a greater number of workemen cannot worke in ſo narrow a paſſage, they take on fiue or ſix workemen, and give them 4, 5, 6, yea ſometimes more rixdallers apeece, as they can agree with them, and as the danger is little, or great.

In this manner of work, being come ſo neere for the ſafeguard of the Muskettiers, which are to giue fire, there are *musket baskets* ſet vp vpon the top of the *parapet* of the approches, cloſſe one to another filled with Sand or Earth, between which the Muskettiers puts out the noſes of their muskets to giue fire upon the beſieged.

And becauſe the approches, the neerer you come to the Fortreſſe are made much deeper then at the firſt breaking of ground, there are one or two *footebankes* made for the ſouldiers to mount vp vpon, and to diſcharge their muskets or firelocks.

As for example, the figure following numbred 153, is the part of a Towne or Fortreſſe vpon which wee are to run our approches, and that vpon firme and good ground.

The Firſt Example.

For as much as the Fortreſſe is environed with a *Corridor* or a Counterſcharfe, one muſt not take the diſtance from the great *Rampart*, but from the *Counterſcharfe*, and begin the approches ſome 90 rods diſtance from the *Corridor*, becauſe one may with the more ſafety put the ſpade into the Earth. Therefore one beginneth the firſt line of approch from the letter *A*, and runs it to the letter *B*, being ſome 30 rods long or thereabouts. The beginning of the line is fortified with a *Redoubt* marked with the letter *C*, into which the workemen (if the beſieged should fall out) may make their retreate, and into which alſo the guards for the workmen may retire. The firſt line turneth at *B*, taking its beginning neere vnto the *Corps de guard D*, and runs to *E*, being ſome 30 Rodds in length, where another *Redoubt* is made marked with the letter *F*, to hold a guard in it, and becauſe it might be dangerous to run this line any further, it turneth from *F* to *G*, and from *G* to *H*, where another *Corps de guard* is made. For the neerer you approch unto the *Fortreſſe*, the more the approches muſt be ſtrengthened with guards and batteries. Beſides the approches there ought to be made deeper, and higher, becauſe you come neerer the Enemies, Canon, and his Musket shott, which may shoot the ſurer upon you, here then you begin to ſet up musket baskets, and make foot-bankes to your approches, that the ſouldiers may gett vp to them when they are commanded to giue fire.

When one is approched ſo neere by meanes of theſe turnings and traverſes that the remainder may be run with a long *Traverſe*, then one begins to Sapp from *H* to *I*, from which alſo one may make another line to approch unto the other ſide of the ſame Bulwarke, or alſo the other Bulwarke, as the line from *I* to *K*, shews. Behinde theſe lines the muskettiers gets up allwaies to diſcover, and shoot at thoſe that would peepe into them.

There are likewiſe two Redoubts made on both ſides for guards, as the letters *N* and *O*, do show.

In the *Interim* a Sapp is begun, that runneth towards the Bulwark, which one is reſolved to mine in, and which is made in the ſame manner, as we have deſcribed aboue, when you ſapt into the *Counterſcharſe*, and that you are come to the brinke of the *Moate*, then you are to fill and damme it vp, and to make a gallerie, and blinds which wee will treate off when wee come to ſpeak of a Gallerie.

While you are buſyed about making your approches, diuerſe batteries are made here and there, which ſerue partly to ſpoile the Ramparts, and partly to diſmount and hinder the Enemies Canon from playing upon you, and to keepe the beſieged in awe, that the workmen may worke with the more ſafety, as you ſee by theſe ſixe batteries noted in the figure 153, and thus much for approches vpon good ground.

Wee haue divided the approches, which run in a right line into three ſorts: The firſt is in a narrow way, an Earth which may be ſpitted out ſomewhat deepe, and yet nevertheleſſe without turnings and *Traverſes*: The other is when you cannot digge into the Earth, but there is, or you ſhall have water preſently, as hapneth in low and moorish grounds.

The Second Example.

When you are to approch vnto a *Fortreſſe* in a right line, and that the nature of the way through which you are to carrie your approches, is of ſuch a condition, that you cannot digg into the Earth with ſpades, then you muſt do as is showne in the figure 154, where they are covered with Earth both on ſides, & are made a little deeper then ordinary Approches. Now ſeeing the danger is greater in this kind, then in the firſt, and that a right line cauſeth you to be continually in the ſight of an Ennemy, you muſt prevent, and avoid that danger by making of blindes, which are either made of bundles of riſe, or brush, or with thick oaken planckes foure or five ynches thick, and as in this figure you may ſee, for what vſe they ſerve.

The third example.

There where one cannot digg, as in Marras and moorish places, a foundation muſt be made with ſinkers, that is bundles of boughs bound faſt together, vpon which (as is ſaid) Earth is caſt. Vpon this foundation one makes *Traverſes and Blinds* with *Gabions* as you may ſee in the figure 155.

Theſe *Gabions* are alſo filled with Earth and made ſo ſtrong, that they are Canon proofe, one may ſett vp alſo a double row of *Gabions*, which ſometimes haue Earth caſt about them.

The bredth of ſuch approches is from 4 to 8 Rod, as the place is narrow or broad, and as neceſſity and danger requires, but the Ordinarie bredth is noe more but foure or fiue Rod.

One muſt haue alſo a care, that one *Traverſe* endeth there where an other beginneth, to witt, there where an alley is left.

The like manner of *Approches* were made at the ſeige of the *Boſch on Count Erneſt* his ſide, to which as being a new found-worke, it got a new name, and was called the *Greate Gallerie*.

This manner of Approch may be vſed alſo in a ſtonie ground, where one cannot digg the Earth becauſe of ſtones.

The

The fourth Example.

Againe you meete ſometimes with a foundation, which one cannot paſſe through *dryshod*, and cannot get deepe enough into the Earth, but one is forced to approch in that manner as is repreſented in the figure 156 in taking the neereſt way, which may be to approch vnto the *Fortreſſe*, and the Approches is made of that Earth, which is digged about it, in ſtead of ſetting vp of *Gabions*, And as in the former Approaches the traverſes, and blinds were made of Gabions, ſo here they are made with whole Redoubts: in the midſt whereof there is a gape or a Sallie, made in ſuch ſort, that the one Redoubt is ioyned to the other, the greateneſſe of every *Redoubt*, being ſome ſix or eight Foote in length, and as much in bredth.

Such *Traverſes* are oftentimes made ſo ſtrong, that they are able to reſiſt a *Canon-bullett* when they have Earth enough, for ſometimes they are made ſixe foote, but the heigth of of them is not alwayes alike, ſeing they muſt bee made higher there, where moſt danger is.

The gates are made in ſuch ſort with a falling plancke, that they may bee drawne vp, and shut, and are of that height, and bredth, that a waggon may come through them.

It is a thing impoſſible to deſcribe all the maner of Approches, becauſe they are ſo mixed and of ſuch great diverſity.

Neither is the ordinary way of approches alwayes a like, becauſe the one are made deeper, and larger then an other: but commonly they are from 8 to 14 foote broad, and three or 4 foote deepe in the Earth, or their therabouts: the *Baſis* of the Earth layd vpon it, in ſtead of a parapet, ought to be betweene ſeven and eight foote.

Wee have propounded as an example for them two *Profiles*, marked with the numbers 157, and 158, whereof the greatneſſe, & meaſure of them, is noted with letters and numbers in this table following:

THE DEMONSTRATION.

	FIGVRE.	157	158
The Profile of the figure marked.			
The inferiour bredth of the Approch.	*AB*	9	12
The depth of the Approches.	*FB, EA*	3	4
The Talud or Slooping exteriour.	*FD,*	1	2
The Talud inferiour of the approches.	*CE,*	–	1
The Bredth of the Approches above the Earth.	*CD,*	11	15
The Baſis of the Parapet above the Earth.	*LC,*	8	10
The Talud exteriour of the parapet.	*KL,*	1	2
The Talud interiour of the parapet.	*GC,*	½	1
The height exteriour and interiour of the parapet.	*IK, GH*	3	4
The Top of the parapet.	*HI,*	6	7

We have expreſly omitted the foot-bancks, becauſe they are not made in the beginning of the Approches, which ought to bee made in the Approches after diverſes manners ſometimes this way, and ſometimes many as occaſion may ſerve.

OF COUNTER-APPROCHES.

THE SIXTH CHAPTER.

THe *Beſeigers* hauing approached neere vnto a Towne or a Fort, it behoues then the beſeiged to look well about them, and not to be idle, but ſtirring, and to doe their vttermoſt endeavour to hinder, and offend their Enemy.

The defence which is made againſt theſe Approches is rightly called *Counter Approches.*

This defence alſo is made after diverſe manners, firſt when the Beſeiged are a great number, ſo that oftentimes they are able to fall out, and make Sallies, which they ought to do as often as may be, notwithſtanding that they looſe men, which of neceſſity muſt happen, becauſe the Beſeigers are much more ſtronger then the Beſeiged, and haue farre more forces, then thoſe which are within the Fortreſſe.

For by this meanes the Enemie will be hindred, and his Approaches ſlowly advanced, being many times beaten back, and conſtrayned to retyre into his workes, during which *Alarme*, they cannot advance forward their workes, neither can they begin them againe, till the Beſeiged are retreated.

They ought to haue a ſingular care, when one makes a Sally, that their men be not expoſed to ſlaughter, but muſt be commanded to fall on with diſcretion, advantage, and profit, to the end that the Towne or Fort beſeiged be not bereft of their men by foole-hardineſſe, rashneſſe, and imprudencie.

For a Fortreſſe which wants men, may bee compared to an empty purſe which hath no money in it. It lies much vpon the endeyour of the Horſe, which are in Fortreſſes, for making of Sallies, and which ought to fall out oftner then the Foote, becauſe they can fall on and retreate with more ſpeede, and though ſome be loſt, yet the hurt will not be ſo great, as the loſſe of foote, which muſt be huſbanded, and ſpared as much as poſible may be, to repulſe the aſſault of an Enemy.

The ſecond manner of defence is made by *Canon*, which muſt play continually from all places vpon the workemen and approches, to doe them as much harme as poſſible may be, whence it comes to paſſe, that the Workmen are amazed and frighted, when they ſee many of their fellow workemen fall and ſlaine miſerably by the Canon, which will abate their courage, and make them worke more faintly: in ſuch ſort, that an Enemy is driven to leaue of their worke, till ſuch time as the offenſiue ſide haue made Batteries, againſt the Beſeiged.

But when it is not feiſible, they muſt be conſtrayned at laſt to breake vp, and quit the ſeige, otherwiſe if they continue, it wilbe exceeding chargeable to them, becauſe no men will undertake the work, but ſuch as wil be ſoundly payed for it.

For every man hazards his life, when Ordinance and Musketteirs play continually vpon him, and a man will not venter his life for nothing, but will ſell it at as deare a rate as he can: beſides in ſo doing, it prolongs the time for an Enemy, ſo that a Fortreſſe may ſometimes be relieved, or when Winter, or bad weather comes on, they may be forced to abandon the Siege.

The third manner is by makeing of all ſorts of *Outworkes*, and in takeing vp the Ground, whereunto an Enemie Approches, which may be made during the ſiege, and while an Enemie approaches, as by makeing of *Rauelings*, *Halfe-moones*, *Horne-workes*, *Tenailles*, *and Traverſes*: for all theſe workes may be made, while an Enemie advances his Approaches towards a Towne or Fortreſſe, but it were better they had bin made before the Towne was beſeiged, for the gaining of time, and ſaving of charges, which might be employed in other works.

The fourth maner is when the Beſeiged make Counter Approches, whereby they may reſiſt an Enemy that he may not get into the Outworkes and *Counterſcharfe* with his approches, where to hinder him, they muſt caſt vp ſome *Traverſes*, and other lines running them from

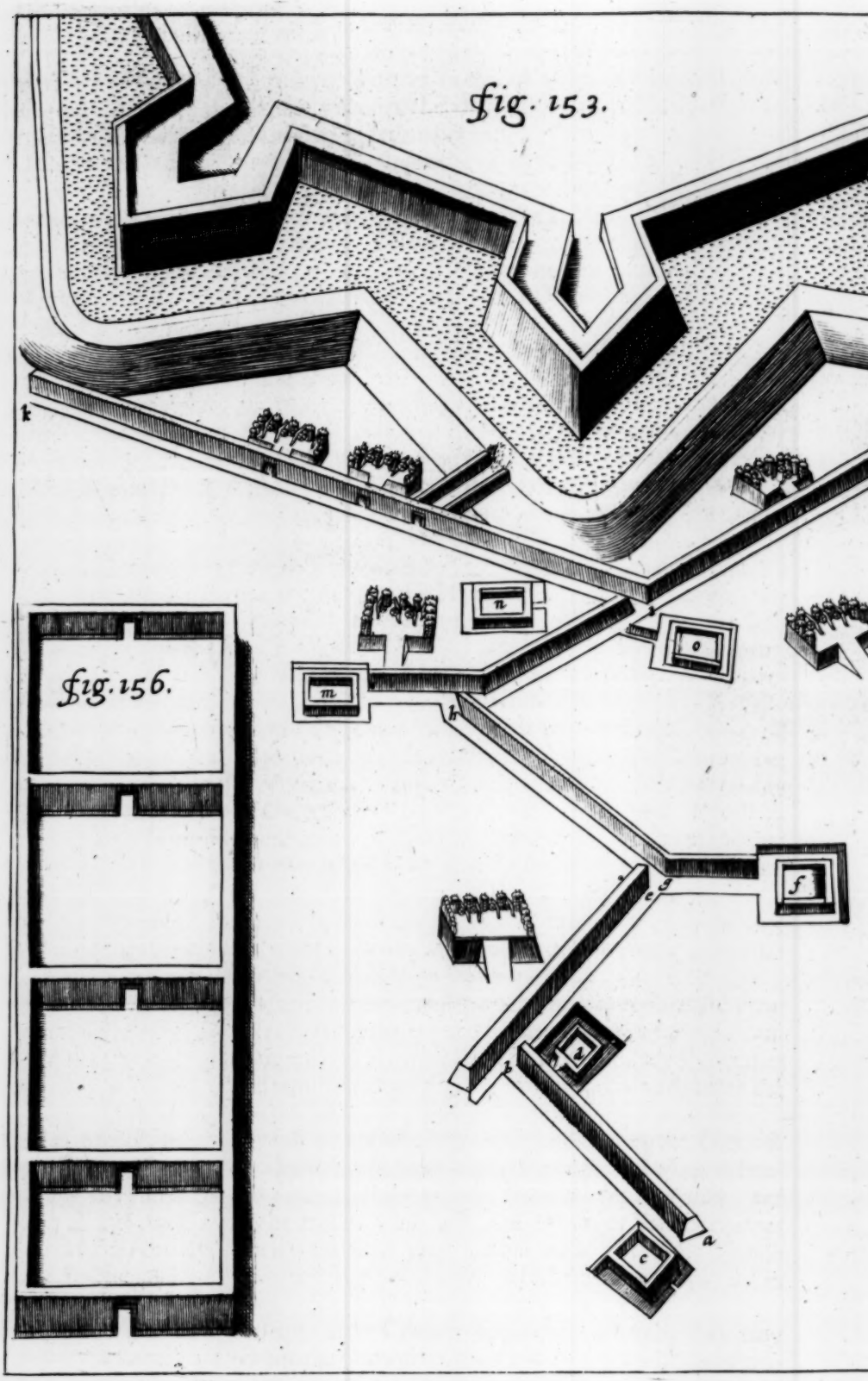


fig. 153.
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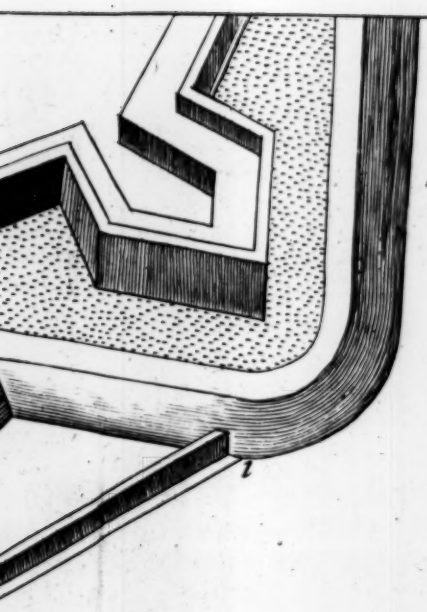


Fig. 154.

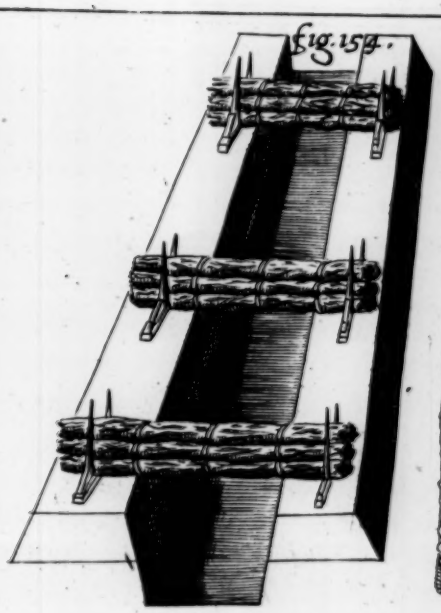


Fig. 155.

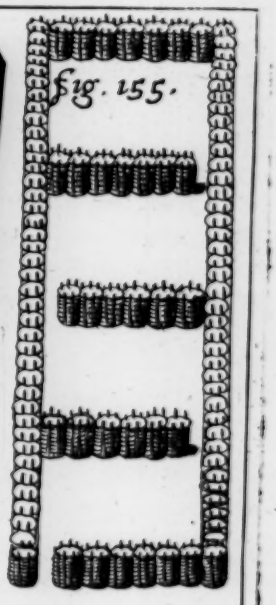


Fig. 157.

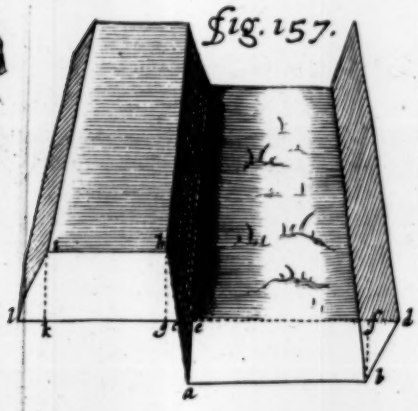


Fig. 158.

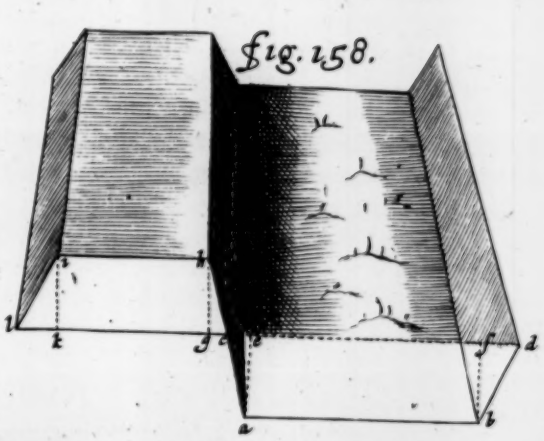
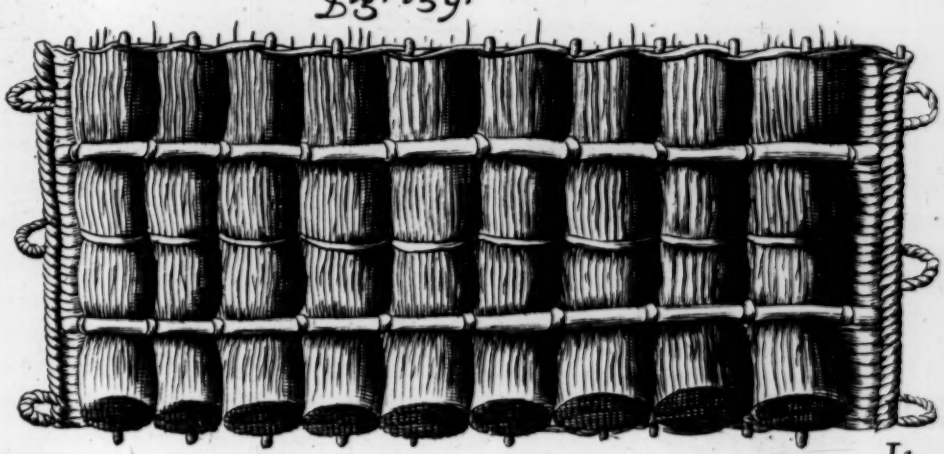


Fig. 159.



from their outworks, as it were to meete the Enemies works, and ſo make them get ground (as it were by peece-meale) till they come to the Fortreſſe: But nevertheleſſe one muſt obſerve well, that they muſt be carried and made ſo, that they may alwayes flanke vpon the *Beſiegers* workes, and approches, and that the *Approchers* may do them as little harme as as may be, alwayes making them ſo, that they lie open towards the Town, or Fort beſieged, from whence they are to be defended, and muſt be ſo carried, that they may giue no advantage to an Enemy, when he takes them in, and ſee that they may be flanked from the Town and Fort both with Canon and musket.

At the laſt ſiege of *Bergen vp Zoome*, there were many ſuch *Counter-approches* made wherewith the *Beſieged* gauled the enemy shrowdly, in ſo much that he was not able (not withſtanding the loſſe of abundance of men) to get a foot of ground of them, having cheſts in the Counter approches which plaied continually with muskettiers, & fires locks vpon the enemy, & caſting fireworks among them, taking up alſo the ground, & advantagious places before the Enemie could approch vnto them, which did disharten them much, for as ſoone as *Prince Maurice* of happy memory, came to *Roſendale* with his army to relieue the Town. *Marquis Spinola* ſeing no hopes of getting it, after the loſſe of twelve thouſand men, was driven to riſe without it, and to quit the ſiege.

OF ALL SORTS OF BRIDGES, ESPE-*cially, your flagg, or Bulrush Bridges.*

THE SEVENTH CHAPTER.

UPon an expedition of warre, when of neceſſity an army to paſſe were a River, or a brook, there are commonly carryed boates, or ſloopes upon waggons, as hath been taught before, having Beames, are boards, all neceſſaries laid in the boates to be vſed, firſt they take downe the beames, and poſts, & then the planckes, and boards, which is done in a trice, when all things lye in order, ſometimes they carry onely boates, and ſometimes onely planches. To make then a bridge over a River, firſt theſe Boates (as many as you ſhall have uſe off to laye over the River) are launced into the water, which are bound together with ropes, and faſtned with cables and anckors in the bottome over, which ſparres, and beames are layd, and then planckes and bords layd orderly upon them, for men to march over. There are likewiſe ſuch kinde of bridges made with great boates in Fortreſſes lying upon a River ſide, when an Enemy is feared, & where one dares not make any other bridge: For, it is drawn up every night like a *draw-bridge*, that if an Enemy had any enterpriſe upon that place, he might not paſſe over it.

There are made likewiſe bridges over the moates of the outworkes of a Fortreſſe: but an Enemy being approched neere unto the fortreſſe, having made batteries to beate them down, theſe bridges are broken down in the outworks, and ſaillie bridges made, to which they cannot doe much harme, for the making of which one takes ſome Barrels, or Hoggsheads bound about with iron, and pitched, unto which rings of iron are made faſt for to put poſts into them, by which meanes theſe Barrels are joyned together, and lockt one to another, upon which there are laid planks for men to paſſe over and repaſſe, & if one would take them up in the night, they do it in ſuch a manner, that they are ſoone ſundred one from an other. An Enemy cannot ſo eaſily ſpoile ſuch a bridge, becauſe it lies even with the waand if ſome part of it ſhould be ſhott a peeces, one may preſently help it againe, with other Barrels and poſts.

There is an other kinde of Bridge, over which one may give an aſſault, whereof ſome of them are borne upon waggons, and others upon boates, and are made after the manner of *Draw-bridges*, ſaving that they are lighter, & are drawn upon the waggons, or boates upon which they are laid, but when one is to uſe them, then they muſt take them down. Read the Treaſurie of the *Mechanick Secrets* of *Auguſtine de Ramely*: The Artilery of *Diego Vffano*, and the *Theater* of the Inſtruments of *Henry Leyſing*, which treate of theſe things at large.

But of all bridges none are found more neceſſary and uſefull, then thoſe that are made of flaggs and Bulrushes. For all others require great charges, eſpecially, when ſome Ingenier takes ſome old invention from an ancient Authour, and gives it out for a new one: for it is reaſon ſuch a one ſhould be recompenced, becauſe of his invention, and afterward becomes a directour for the making of it, as though no other could be made, but that which he hath invented, and ſo by this meanes makes his benefit of it, and his count and reckoning according to his deſire, by making a bridge, at ſuch a high rate and charge, that makes his maſters purſe light, and his own heavy. But if you looke narrowly upon it, you ſhall finde it to be an old invention, as one caſt off, and ſerves for no uſe. The like doth happen here, for when yee conſider well many new invented Bridges, made with great skill and induſtrie, yet nevertheleſſe they ſerve for little or no uſe. But your bridges made with flaggs, or bulrushes, are nothing ſo chargeable, and yet nevertheleſſe of great uſe; we will ſhew here in few words, how they are, and in what manner to be made.

The matter whereof they are made is a rush called in Dutch *Bieſen*, in French a *Ionc*, in Latine *Iuncus*, and in English a *Bullrush*. This rush groweth in rivers, waters, and brookes ſome foure, five or ſix foote high, and is commonly found in brooke-pits, *Marras*, and wet places, eſpecially by Rivers ſides, whereof alſo many times houſes are thatcht. The nature of this bulrush is to floate above the water, and are uſed (being bound up in a bundle) when boyes learnes firſt to ſwime, putting them under their arme-pits.

This Bridge above mentionned is made with this rush after this manner following, when they are ripe and growne to their length, then they muſt be plucked up, and well dried, and when you would make ſuch a Bridge, you muſt binde up theſe Bullrushes in round bundles, or foure ſquare, whereof the ſides muſt be ſome ten inches braod, and about foure or five foote long.

Now having got good ſtore of them, one makes a hurdle of them enterlaced with ſmall withs, five foote broad, and 7 or 8 foote long. Upon this hurdle one layes, and bindes in order the bundles one after another. And afterward one takes two long ſtakes, a little greater then a pike, which is faſtened to the hurdle, drawing and binding theſe bundles faſt one to another, which are likewiſe bound with canvas. At the end of the hurdles one faſtens at both ends two or three rings made with withs, to joyn and faſten the *joyntures* of this bridge together.

Theſe kind of Bridges are of excellent uſe in Seiges, cheifely in places, where one is reſolved to take in a worke vpon a ſuddaine enterprize, and would not be at the charge of makeing a Gallerie.

When one is reſolved to take in ſuch a worke, thoſe which are appointed to force it, being well armed as is requiſite, being come to the brinke of the moate by the meanes of the Approches, which are brought thether, they ſend out before ſome venterous ſouldiers, which carrying this bridge launces it into the water, and ioynes the peeces together withall expedition (and while the musketteires giue fire as faſt as ever they can) till they haue laid it over the bredth of the moate, and faſtened it on the other ſide, which being done, the Souldiers goes over it, and ſtriues to enter by all means to take in the work, as they are commanded.

But if there be any mine made ready, they ſtay the putting over of the bridge, and the falling on, till the mine be ſprung, for feare of breaking the bridge, and that it might ſpring backward.

When the Beſeiged are reſolved to make a Sally, they may likewiſe make uſe of theſe kind of Bridges, all other Commodities and utilities neceſſity the mother of ſuch like inventions will shew you.

Now for the better underſtanding of all things touching theſe bridges aboue diſcribed, we haue repreſented them in the figure 159, where you ſhall ſee how they are made faſt on that ſide which is to come into the water.

But they are to weake where you are to put over a broad moate, ſuch as are before Townes *and Royall Forts*, over which one muſt paſſe, before they can come to the Wall, for theſe

ſerve

ſerue onely for ſome ſuddaine peece of ſervice, and therfore it is needefull to make uſe of ſome other invention called a Gallerie which are of excellent uſe though chargeable, & which wee will handle in the next chapter following.

OF GALLERIES

THE SEVENTH CHAPTER.

Vegecius in the 16 chapter of his fourth booke diſcribeth a certaine kinde of worke, which the *Ancients* called *Vinea*, and ſaith it was a worke made of plancks ioyned together, ſome eight foot high, 7 foot broad, and fixteene foote long, the roofe or topp whereof was covered with boards, and hurdles interlaced together, and the ſides with Boughes, in ſuch wiſe that it could not be ſpoyled with ſtones, over which alſo was laid thick *Oxen hydes* newly killed, or coverlids of *Hair-cloath*, to keepe them from fyring (whence it hapneth, that we make uſe of ſuch coverings in our moderne warres, for to hinder the force and violenee of Gun-powder, becauſe they are not ſo eaſely ſpoiled by fire (as hath bin ſaid aboue) and theſe workes being in a readineſſe, one makes uſe of them to their advantage.

When they havv made good ſtore of them, then they joyne and faſten them together, and the *Beſeigers* being blinded and covered under them, begin their approches to the wals and ſapp under the foundation of them to make them fall.

There is no work which reſembles more rightly this invention, of the Ancients, then our moderne Galleries. The preparition, the uſe, the height, the bredth, are almoſt all alike, and do agree ſo together in all things, that we muſt needs confeſſe that our *Gallerie* is noe new invention, but was in uſe among the *Ancients*, and which of late yeares hath bin renewed againe.

For if one conſiders neerely their ſtructure: the *Vinea* of the *Ancients* was made with timber and plancks: and our Galleries for the moſt part are made with poſts aad plancks ioyned together. That had alſo poſts to reſt upon for its foundation, and this hath alſo great poſts to beare up the weight of the whole worke. The ſides of the *Ancients Vinea* was fortified againſt the force of the *Baliſts*, becauſe they were laid with hurdles and boughs, wreathed together: but our Galleries are covered with plancks and Earth caſt upon them, ſo that they cannot be ſpoyled by Canon. The *Vineas* were kept from fyring by the helpe of *Oxe-hids* wherewith they were covered, and the ſides of our Galleries haue Earth caſt about them, that fire-workes may doe them noe harme.

Theſe *Vineas* ſerved to come to the Wall, to ſapp it, butour Galleryes are brought to the *Baſis and Barme of a Rampart*, to make a Myne in a Bulwarke, and ſo to blow it up.

The height, and bredth of the one, an the other doe not differ much, but it ſeemes the length is differing, though in effect it differs not much For the *Vinea* the ioynts of them being faſtened one to an other were reaſonable long, but our *Galleries* are ſett up with planks and poſts, and as it were makes but one peece ioyned together.

Whence it appeareth, that our Gallerie is not wholly a new invention, but hath bene in uſe of old, though in ſome things it is altered and changed.

Wee will now take it in hand, and ſhew after what manner, it muſt be made with all the appertenances thereunto belonging.

When an *Approch* then is brought ſo farre, where a Sapp is to beginn not farre from the Town, or Fortreſſe beſeiged, and that one is ſapped to the Counterſcharfe, then one ſees how a Gallerie may be put over the moate. For the effecting whereof, one muſt make proviſion of many things neceſſarie thereeunto, and firſt of all gett good ſtore of longbrush & bundles of boughs, to fill up the moate, with a great number of plancks & poſts ioyned & made together like a Gallows, all of them having one height and bredth, which are ſo framed and made by the *Carpenters* before they are brought down into the Approaches, that

one may either take them aſunder, or pinn them together without any great labour, for being brought thither, where they are to be uſed. It is eaſely done, by marking the ioynts and peeces with one and the ſame number which they may fit, and ioyne together without any great difficulty.

Such a *Gallowes* hath fiue peeces, to witt two poſts which ſtand upright one croſwiſe over them, which ioynes the other two together, and two props or Supporters of timber to bear the croſſe poſt up. The two poſts are ſet upright being eight or nine foote long and are cut halfe a foote in the upper end of them, for the croſſe beame, or poſt to reſt upon the other two poſts, and to ioyne them together, and a foote and a halfe at the lower end is sharpened and ſet faſt into the Ground, ſo that it remaines ſeuen foote high for the topp of the Gallery. you shall ſee the forme of it, ſett out in the 160 figure following, whereof the length of them from *a b* and *c d* are each of them 9 foote long, and the bredth 6 or 7 ynches: the half of this breadth at the uppermoſt end of theſe two poſts is cut the length of half a foote, to lay the croſſe beame upon them, which ought to be cut in the like manner, having the length of ten foote, or thereabouts, for the longer this croſſe poſt is, the broader will the Gallerie be, and the better for the ſouldiers to march five of ſixe in front, when they are to give an Aſſault upon the breach, the greatneſſe is anſwerable to the two others, being marked with *A C*. Now for as much as theſe poſts are made in ſuch a manner with joints, that they may ſoone be joyned together, or ſevered, they cannot be ſo firme, as thoſe which are joined and pinned faſt together by force, without being afterwards taken aſſunder, eſpecially, becauſe of the great weight, which they are to beare, therefore there are props made to ſupport the croſſe poſt, as you may ſee by *E F* and *G H*, marked in the 160 figure, all which being done, and all the peeces joyned and pinned faſt together as is fitting, every peece is marked, & holes bored through them to faſten them together in a little time, when there is occaſion to have them ſet up.

Of the Bords, and Plancks for a Gallerie.

After this you muſt provide in a readineſſe good ſtore of *Fir-boards* & plancks, which muſt be as long as the two poſts, or rather 4 or 5 ynches longer, ſo that if the diſtance between poſt and poſt be 5 foote broad, then theſe plancks muſt be five foote, and a half long: for the odd half foote is divided into two equall parts, takeing up three ynches on eyther ſide of the two poſts, into which holes are boared, to naile the planckes and the poſts faſt together.

The ordinarie ſpace between the poſts ioyned together is commonly 4: or 5: (but ſeldome) 6 foote in bredth, which oftentimes is changed, according to the condition of the place, and as the danger is great or little.

The thickneſſe of the planckes is without any certaine meaſure, becauſe it is needleſſe to make them all of one thickneſſe, for it may ſo fall out, that ſometimes you muſt uſe a thick planck, and ſome-whiles a thinner is fitter to ſtop a hole withall, as Occaſion may ſerue.

Now for the ioyning and faſting of your poſts together, you muſt provide good ſtore of *Oaken-pinnes*, and boore all the holes with a *boorer*, to the end the holes may not cleaue, now all theſe pinnes ought to be of one bigneſſe.

Alſo in *Galleries* there are uſed nailes ſome greater and longer, as you shall haue uſe for, ſome of them are 4 or 5 ynches long for to naile the plancks with, which covers the ſides: ſome others 6 or 7 ynches long, which naile the props into the poſts, you muſt haue good ſtore of them of all ſiſes for to uſe them, when neceſſity shall require. Your ordinarie *wheele-barrowes* and shovels are here of excellent uſe, but you muſt have *shovels*, that have longer haftes then ordinary to caſt the Earth a good way into the moate, which cannot be ſo well done with short hafts.

In this place one ought to make uſe of thick planck-blindes, which wee haue mentioned in the Chapter of *Gabions* and blinds, which ſerve for a very good uſe in *Galleries*, as we shall show you hereafter.

A Gallerie

A Gallerie raiſed without, being covered with Earth, is repreſented unto you in the 161 figure.

After you haue ſapt through the Counterſcharfe, and that you are come to the edge or brinke of the moate, and reſolue to lay a Gallerie over it, you muſt firſt of all provide good ſtore of theſe bundles of long brush before mentioned, brought downe in waggons, and abundance of Wheele-barrowes, to fetch Earth into the Gallerie, to caſt theſe things into the moat, and to fill it up, even to that place, where you intend to make a *Mine*, and in ſo doing, you ſhall by degrees fill up the moate, and make a good foundation for your Gallerie to reſt aud ſtand upon.

But becauſe any cannot caſt and lay theſe brush faggots in order, as one would, you ſhall meete with ſome venturous ſouldier or another, who for money will adventure in the night to goe out at the mouth of the Gallerie into the moate, to lay them in order. And to the end they may not be ſeene by the Enemy, one muſt obſerue well to take the *perpendicular* of the face of the Bulwarke, which wilbe the ſhorteſt way to come unto it.

The moate then being filled with theſe long bundles, and fagotts of Brush abouesaid, ſo that one may caſt Earth upon them brought from the next ſapp, the workemen fetches good ſtore of Earth in wheele-barrowes upon plancks laid in the Gallerie, and brings it to the mouth of the Gallerie, caſts it upon a heape, and then two or three workemen which are appointed to worke in the mouth of the Gallerie, caſts it into the moate to ſettle the fagotts. This Earth caſt up in the forme of a heape, ſerues to cover and make a blinde for the workemen onely before, bnt not on the ſides, and therefore they muſt be conſtrayned to make blinds on that ſide which is moſt dangerous, till the poſts be ſet up, yea oftentimes they muſt make blinds on both ſides of the Gallerie, if an Enemy flanks it from two places. After this one begins to ſet up one of the poſts, ioyned and pinned together as hath been taught, and as you may ſee in the 160 figure. And ſets ſome men continually to fetch Earth in their wheele-barrowes, others from the top of the heape caſts the Earth with their Tong-shovels into the moate, and gets more ground to ſet up the other poſt, for having got a matter of fiue foote or thereabouts, they ſett up the other poſt ioyned together as is ſaid, after they haue ſet forward the blinds for to cover the ſides of it: which two poſts being ſet up, then they naile the plankes faſt to both ſides of the Gallerie, and they ſet onely the others upon it without faſtning them, by covering the ſide onely with Earth, which may be beaten downe by the Enemie, till it is able to reſiſt a Canon bullett, and then caſts Earth aboue the Gallerie, about a foot, or a foote and a halfe high, which muſt be ſpread, and laid even, to the end fireworkes, may not lie upon it, and ſpoyle the Gallerie by fyring of it.

It happens ſometimes, that one ſide of the Gallerie is out of the Enemies ſight, and cannot be beaten downe with their Canon, in ſuch ſort, that one needes not cover it with Earth and then that time and charge is ſaved, unleſſe it lies ſo, that an Enemie can ſett fire on it with pitch ropes and other fireworkes, or ſpoyle it with his Canon, which lies in his *Outworkes*, which being ſo, then of neceſſity, you muſt cover that ſide, till it is able to reſiſt the Enemies Canon.

And becauſe it would be very darke if the whole Gallerie were covered with Earth, and ſo very incommodious for the workemen, therefore to helpe that on the ſafeſt ſide, there are little windowes or holes made of a foote high, and a foote and a halfe long, betweene everie three or foure poſtes ioyned together, to giue light into the Gallerie.

This worke is continually advanced, and the heape raiſed by the workemen, which caſt the Earth into the moate in a greate quantity before them, haueing alwaies a ſingular care, that the heape from whence they caſt their Earth growes not too low, leaſt the workemen be diſcovered. Afterward they ſett up the third poſts ioyned together in the ſame manner as hath been ſaid, and naile faſt the boards, and planks to them, this labour muſt be continued till the Gallerie is advanced even to the very foote and barme of the *Rampard*.

All which is showne in the 162 figure where a Gallerie is made & covered, as alſo to show that one of the poſts ioyned and ſet up, which muſt be nailed to the others with plancks, and the heape of earth behinde which the man ſtandes and works, is alſo here pourtrayed out.

When the Gallerie is brought over almoſt to the very foote of the Rampart, then one may come to it with more ſafety, for then the Heape is taken away, and a blinde made of thick Oaken plankes to begin a mine into the Bulwarke.

At the lower end of theſe poſts abouesaid, as you may ſee from B to D, there is an other poſt beſides of the ſame greateneſſe, which cannot be ſeene, therefore wee haue purpoſely omitted it, but will remember to ſpeake of it, when we handle the makeing of the poſts and paliſadoes.

THE EIGHTH CHAPTER.

OF MINES.

AS a *Gallery* is an ancient invention, ſo likewiſe *Mines*, which we make at this day, haue been heretofore in uſe amongſt the *Ancients* alſo: and this is the laſt thing wherewith the Beſieged are troubled.

A *Mine* then according to the definition of *Vegecius*, is a *Cave* by which one makes *ſecret goings* under the Earth, to come by night unawares to a Fortreſſe, or by which one diggeth into the foundation, and bowels of a wall, or of a Bulwark, underpropping the earth with poſts of wood, and laying under it dry wood, for when they would make a hole in the wall, they ſet fire on this wood, which being burnt with the props, the wall fell down, and the Beſiegers being in a reddineſſe attending the fall of the wall, ran preſently up by that breach, to aſſault the Fortreſſe; which is underſtood alſo of our moderne *Mines* which we make in, by blowing up the powder that is laid in them, whence it appeareth clearly, that this is alſo an ancient invention, being a little changed, and amended at this day.

This mineing (or digging under the earth) is called in Latine *Cuniculus*, of which name ancient Writers, as *Iulius Cæſar*, *Livius*, and *Curtius* make often mention of in the deſcription of this *Stratagem*, it ſignifieth a Moole from whence the name is taken, becauſe the Mines made under *Rampards* and *Bulwarks*, reſembles the holes and paſſages, which mooles makes under the earth. There are others which derive this name from the Latine word *Cuneus*, becauſe the Mines are made in the faſhion of a *Wedge*, which is thick at the beginning, and diminisheth little by little, even as the Mines which make a rupture in thoſe places where they are made, may be compared to a wedge, which cleaveth a piece of timber in ſunder. *Mines* were of old called *Cuniculary*. He that is deſirous to know more thereof, let him read *Vegecius* and *Vitruue*, who haue written of Military inventions among the ancients.

We will here deſcribe in a few words, how our *Moderne Mines* are made at this day.

The laſt meanes for the forcing of an Enemy beſieged, to make him yeeld, is this making of a Cave or Mine under the earth, which is begun and finished (as is ſaid) after you have brought your *Gallery* over to the *Barme*, or foot of a *Rampard* or Bulwark.

But before it is begun, you muſt have all things neceſſary, and in a reddineſſe, for the effecting of this work, firſt of all ye muſt have Spades, Shovels, Pickaxes, and all kinde of Maſons tooles, with all things requiſite to pierce and break the wall, wherewith the Rampart is made.

Afterward, one prepares props to ſupport, and beare up the Mine from falling or ſinking, being two, or two inches and a halfe thick, the length of them being not alike, becauſe the entrance into the Mine is made higher then towards the end of it. One is furniſhed alſo with firre planks, for to line the Mine within, as above, that it may not ſink and fall down, for it muſt be ſet with planks on all ſides, as well as the foundation, eſpecially if the earth be moulding and wettish.

But before you begin to make your Mine, it will be neceſſary that you know the condition

tion of the place, that is, whether the Bulwark be hollow and vaulted, or whether the foundation be laid with Branchages, Logs, or borne up with Piles: and whither water may not ſpoile your Mine, if you should mine too low. In caſe that the Rampard or the Bulwark into which you intend to mine were laid with logs, or ſupported upon great Piles, which happens ordinarily in moorish and rotten places, upon which you muſt build your Bulwarks, and Rampards; or when one can get no other Earth but ſand; you muſt try and get out all theſe Piles with Cables or ropes, by winding them out with an inſtrument ordained for this purpoſe. Now you muſt pierce and pull out theſe loggs by ſuch wayes and means as is known unto Miners, for the making of a way, and a chamber to lay your Gunpowder in. When you are aſſured that you cannot digge no deeper, but that shall come to water, then you muſt raiſe your Mine a little higher, to the end the powder may lie dry in it.

The Miners then beginning to break into the wall, do carry their Mine ſo cloſe, and ſecret as poſſible may be, that the Beſieged may not heare any noiſe, or gather any notice, where the mine in made, and how it runs: for if they do, without all queſtion, they will make a *Counter-mine* to diſcover and ſpoile your Mine begun, ſo that you shall be driven to begin a new one in another place, as hath hapned many times.

The heighth, and the bredth of the *Mine* muſt be made in ſuch a manner, as you may onely lay in the Barrels of powder, for it ought to be no higher, nor no broader, becauſe your intention is, but onely to chamber your powder in it, and therefore it muſt not be ſo high as a man, and no higher, but that a man may onely work in that upon his knees, and that he ſtoops lower, when he goes to lay the powder into its chamber.

The heighth then muſt be but 4, or 4 foot and a half high at the moſt, and the bredth but 3 and a half, or foure foot, according to which meaſures, the props and the planks are framed, wherewith you are to underprop the Mine.

When you begin to mine into a Rampard or Bulwark, you take out the earth, and carry it away in a veſſell, or a pall of leather, which is light, in handing it one to another, till it be brought out of the hole, or entrance into the Mine, and laid in the Gallery, to the end the Enemy may not ſee it, and geſſe whereabouts your Mine is.

The *Maſter-Miner*, which hath the conducting of the Mine, ought to be a man of great experience, how he ought to carry it, leſt he be miſtaken, and ſo make it in a place, where he ought not to make it. Therefore he muſt have knowledge of a *Compaſſe*, and how the *needle* ſtands, that he may carry his Mine aright. He ought alſo to have skill in *Geometry*, to the end he may know of what heighth he muſt carry his Mine, according to the proportion of the Rampart.

The nearer he comes unto the place where he is to make his Chamber, the narrower ought the way of the mine to be, in ſuch ſort, that it muſt be no broader or higher at the entrance into the *Chamber*, but that a Barrell of powder may ſcarcely paſſe through the way, for the ſtraighter and the narrower the paſſage is into the chamber, the eaſier the Mine is ſtopt.

The place where the Chamber is, ought to be ſo made, that the powder doth not break neither the one, nor the other ſide, but that it may blow the earth upward. Nevertheleſſe ſometimes the Miners are commanded, to make their Mine ſo, as it may blow the earth into the Fortreſſe, or elſe without which may be done, if they make that ſide, which is to be blown up, not ſo thick as the other: for the nature of powder is ſuch, that it maketh the greateſt operation alwaies towards the weakeſt place, and though it blows it up ordinarily: yet commonly it ſearcheth moſt often the place, where it may break out ſooneſt into the ayre, which appeareth both in your Canon and Muskets.

The bigneſſe of the *Chamber* is divers, for it muſt be made according to the greatneſſe and proportion of the wall or Rampard: nevertheleſſe one muſt obſerve, that it be made as narrow as poſſible may be, and yet muſt have room enough to lay the Barrels of powder into it: the ordinary heighth is ſome ſixe or ſeven foot, and the bredth foure or five foot.

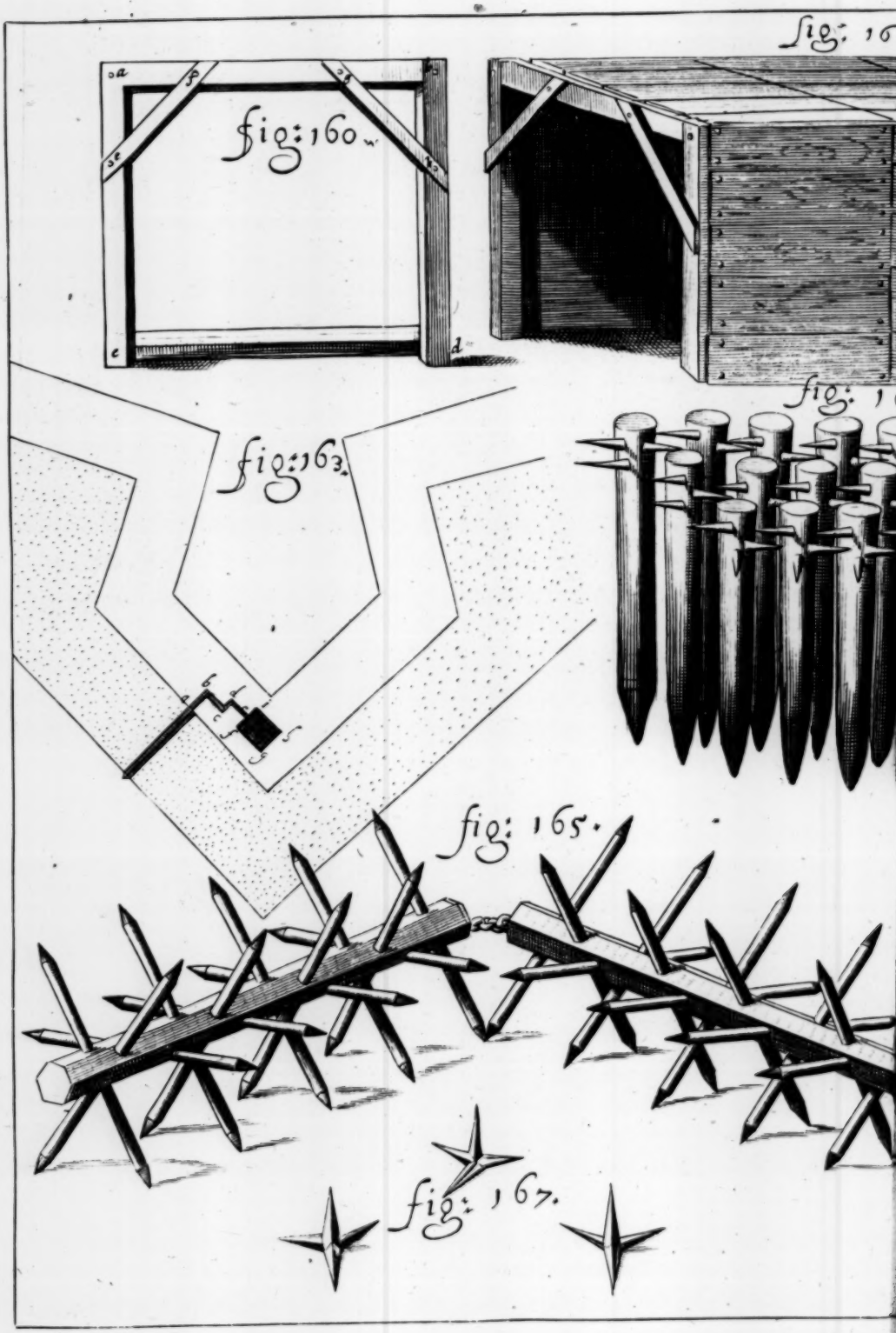
When the Chamber is ready, then you lay in your Barrels, the number whereof cannot be ſo preciſely diſcribed. For one Rampard is greater then an other, in ſo much, that a grea-

ter quantity of powder is requiſite more for one place then an other. The common opinion is, that a Barrell of powder will blow up a rod, or twelue foote of Earth. The Barrels are layd in ſuch order, that in the twinckling of an Eye, they take fire all at one time, which cauſeth a greater operation, then if one Barrell should be blowne up one after an other. After that your powder is chambred, then with all expedition you muſt ſtop the entrance into the chamber, with thick and ſtrong planckes, and ſtop it hard, and ramme it in with good Earth, and leaue a little hole or traine, to lay ſome powder in it, which traine is carryed to the very end of the mine, and ſtops up the paſſage of it with firkins of Earth, that the aire may neither come in or out. For the ſtronger the Mine is ſtopt, it will take the greater effect. All things then being in a readineſſe, it is left ſo till one is commaunded to giue fire to it.

In the 163 figure is repreſented unto you a myne marked, *A B C D E*, is the way upon the Bulwarke, *E* is the entrance into the chamber, *F G H* and *I*, is the chamber it ſelf, wherein the powder is laid.

Here a queſtion might be moved, whether mines ought to be carryed with right lines, or crooked? The anſwer is, that mines, which are carryed in a right line are ſooner made, but becauſe they take not ſo good effect, the other are to be preferred before them, which are made with oblique lines. For the windings and the turnings of them, adds ſtrength vnto them, that the powder hath not ſo much force to breake the ſtopping. Now ſuppoſe that it should breake the ſtopping *D : E* : the reſt therefore is not broken, becauſe the force of the powder is kept in by the Earth marked *D*, and driven back to blow upwards, or finding no vent to turne back againe, where it was layd. But in a right line when the powder breakes the ſtopping, the effect thereof is hindred and diminiſhed, for it is certaine, that the ſtopping, which is made newly is not ſo firme as the old ſetled Earth, which hath lain a long time in it.

OF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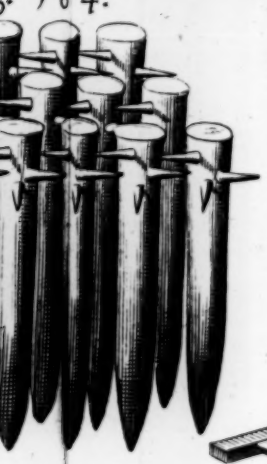

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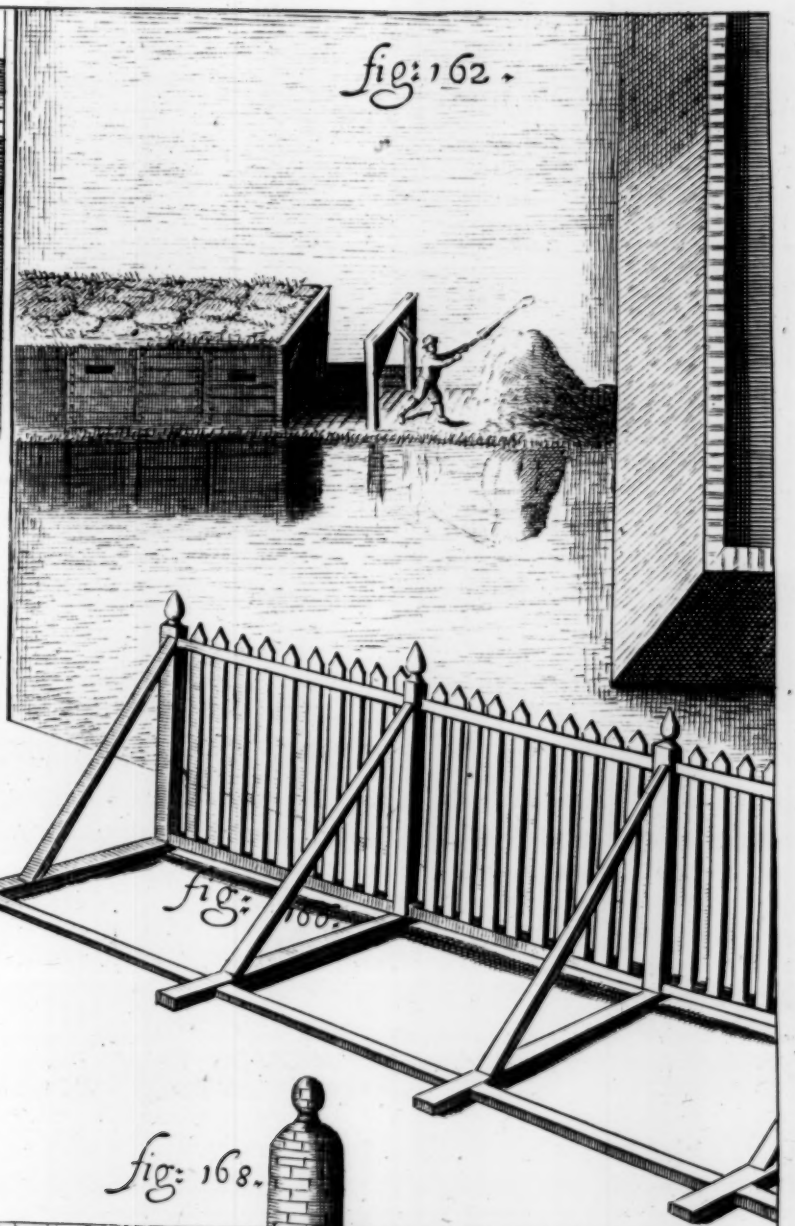

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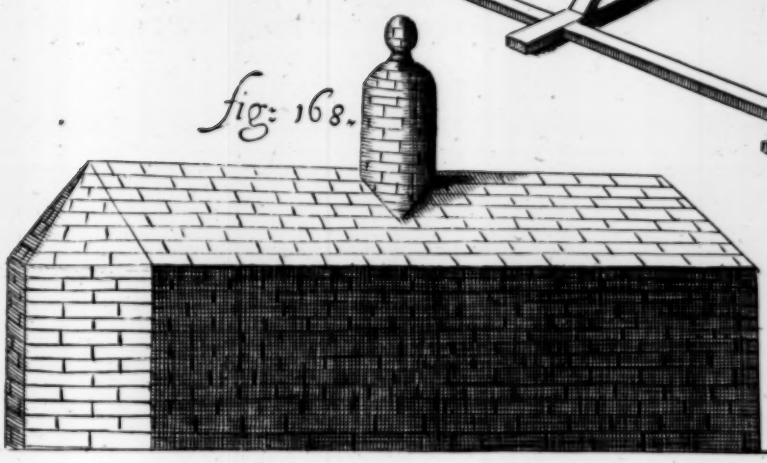

OF COUNTER-MINES

THE NINTH CHAPTER.

WHere there is an *Offenſiue* Warre, there is alſo a *Defenſiue*, as appeareth by mines: for the Beſeiged having diſcouvered them, which one hath prepared for them, and that there is no hope left, but waiting for the Springing of an Enemies myne in their Rampard, and to giue them an aſſault, then they are to ſtand upon their defence, and beginn to make mines alſo, which they eyther doe to offend an Enemy, or to defend themſelues by them. Therefore wee muſt underſtand here, three kinds of mines to wit, the workes which are made to finde out an Enemies mine, 2: The Counter-mines, which are made to ſpoyle an Enemies mine, & 3 the cutting off of a Bulwarke or a *Rampard* within, of the two former, wee will treate in this Chapter.

For the firſt kind of Countermines, wee underſtand thoſe workes, and mines, which are made to diſcover, and find out an Enemies *Mine*, and to kill the miners in it.

After one hath found it out, as alſo for the caſting down of the ſame work, and the taking away of the powder chambred, the Enemy will finde himſelf deceived, when he thinks to ſpring his Mine, attending the operation thereof in vaine, becauſe the powder is ſtolne out of it.

For to finde out an Enemies mine, there are two manner of wayes, the one which was uſed by the *Ancients*, and the other practiſed at this day.

Vitruvius in the ſaid Chapter of his tenth book, deſcribeth the maner of the *Ancients*, and ſaith that the Cite of *Apolonia*, being beſieged, and the Beſiegers having made ſome Mines under the earth to aſſault the Citizens, on a ſudden within the walls; the Citizens being advertiſed thereof, were extreamly affrighted thereat, and began to faint and loſe their courage: becauſe they knew no remedy to prevent it, and could by no means finde out the place where the Mines were made. But *Tryphó Alexandrin*, which lived in that age, the *Architector* of this City, cauſed to be made along under the walls a great many ditches, and withall ſome Mines under the walls continuing them beyond the Enemies, as farre as one could throw a ſtone. He cauſed to be hang in theſe ditches veſſels of Copper, under thoſe places, where the Enemy wrought, which made a noiſe, by reaſon of the moving of the earth, whereupon he found out the Enemies Mines, and filled Cauldrons of braſſe full of boyling water, and melted pitch, to powre it down through holes upon the heads of his Enemies mines. He caſt down alſo mens dung, which was mixed with hot ſand and gravell, which he did by night into the Enemies Mines, into which he had made divers holes, and by this meanes ſlew a great many of them.

Herodotus in his *Melpomina* makes mention of a *Tinker* which dwelt in the City of *Barca*, beſieged by the *Perſians*, who diſcovered the Enemies Mines by the meanes of a Buckler of Braſſe, which he hung in divers places againſt the wall, and ſo found out at laſt the place under which the Enemy mined.

But at this day to finde out an Enemies Mine, they uſe to make counter-ditches, as hath been ſaid, and before a Mine is begun, it is neceſſary to be informed, after the manner of the Ancients of the place, which may be undermined by an Enemy. But Mines are ſearched out after divers other wayes.

Some are of the opinion, that round about the walls, and Bulwarks of a Town or a Fortreſſe, (to wit, when the fortification is firſt begun) one ſhould make hidden caves and paſſages under the earth, by which one might diſcover, and finde out an Enemies mine. But this me thinks is not good, becauſe the walls and Bulwarks are made thereby prove weake, and theſe caves being made with poſts, and planks, which in tract of time are ſubject to rot, and then the Mines afterward falling down, all that labour is loſt. Alſo it is dangerous to make vauts in Rampards, and Bulwarks, ſeeing it is to be feared, that ſuch a work is not durable, ſith it muſt bear up ſo great and ponderous a weight, beſides it will coſt exceſſive expences. And though theſe Countermines should be thus made and ordained: yet it is not cer-

taine, but that an Enemy in myning may meet iuſt with one of theſe Mines, and ſo take his way and advantage, either over or under it, and ſo leave this Counter-mine alone.

A ſecond opinion is, that ſome findes it good, that one should hang trees, and other bushes in them, which are found often in the Rampards of the *Cimbri*, which being ſtirred with the leaſt motion, gives a ſound, whereby one may finde out the place where the mine is. But this is a thing uncertain, becauſe the leaſt gale of wind, will eaſily shake theſe bushes, and branches of trees. And if they do, it muſt be done in a ſtill and a calme weather, when there is no winde ſtirring. And therefore I anſwere, one ought to ſearch out an Enemies mine at all times, for it were an abſurd thing, for one to ſtay from finding an Enemies mine out 'till a calme time comes, who will advance (as much as poſſible may be) his work, without ſtaying for ſtill or faire weather. Therefore this way ſerves but for little uſe.

A third and a better way, and which is the ordinary way, is to ſet a drum in the place ſuſpected, with ſome Dice, peaſe, or beanes vpon the head of it, which upon any ſtirring, will leap upon the drum, when it ſtands over the place where one works. Nevertheleſſe you muſt not let it ſtand in one place onely, but remove it now and then from one place to another, yea ſo often, that you are aſſured of the place, which is shaken by the work which is made under it. Some make uſe of a Baſon of litany filled with water, and imagines, that the mine is there, where the water moveth, but that is uncertaine as that of the *Cimbri* is, ſpoken of before, but that of a drum is held to be the beſt and ſureſt way. Notwithſtanding one may make good uſe of Baſons, when they are ſet upon a *Rampard*, as a drum with peas or other things. For by ſuch a meanes one may know the place, which is undermined. The uſe of Baſons without all queſtion, took its Originall from the Invention of a Kettle, whereof wee haue ſpoken even now.

A fourth opinion beſides theſe which is in uſe alſo; is a great long iron Borer, to bore into the Earth, wherewith thoſe which ſearcheth the Earth, bores a hole with it into the *Rãpard*, & laying his eare to the hole to liſtẽ well if he can heare any noize, which is practiſed in ſuſpected places. Many other Inventions are invented by neceſſity the mother of practiſe.

To reſiſt then the mines of an Enemie, one makes uſe of this practiſe following. After you haue curiouſly ſearched out the Enemies mines, and that you are aſſured of the place under which they are hid then you may find them out without all queſtion, and nothing remaynes then, but to make a *Counter-mine* againſt them, which is made in the ſame manner as we haue diſcribed in the former chapter, treating of mines, to wit, by underpropping the Earth with poſts and laying plancks betweene them, that the Earth may not tumble down. Now becauſe one is not aſſured to meet iuſt with the Enemies myne, which may be made either too high, or too low, therefore you muſt make many, till by one of them you haue found it out, and are come to the *Chamber* to take away the powder.

When an Enemies myneis carryed ſo ſecret, and hidden, that one cannot finde it out, then the beſieged muſt of neceſſity reſolue to quit that part of the *Rampard* or Bulwarke under which they ſuſpect there is a mine, and to cut it of inwardly. But for their advantage they make ready alſo their *Countermine* made in that place, & chambers their powder attending the effect of the Enemies mine, and when he ſprings his mine, then they retire themſelues into their new worke cut off, and the Enemy being lodged in that peece of the Bulwarke or Rampart, which they haue quitted, then they blow up their *Countermine* and ſlay all thoſe, which they find in it.

The like alſo is done in outworkes and Counterskarfes, when one is driven to quitt them, and that one cannot keepe them any longer.

OF

OF PALISADOES: PALES: TURNE-PIKES: BARRICADOES, QUADRANT-TANTERNAILES: AND BEARES.

THE TENTH CHAPTER.

WEe haue often made mention of *Paliſadoes* and the uſe of them, eſpecially when they are ſtruck into the ground about dry moates, for then they ſerue, in ſtead of water againſt the ſudden aſſault of an Enemie, ſo that not onely the moates before great walls, and Rampards, ought to be ſet with them, but alſo all Outworkes muſt be fortified with them.

They are likewiſe of excellent uſe in the Field, when trenches are ſet round with them, and ſtruck in round about Forts, and workes, which lie in the moſt dangerous places.

They are of no leſſe uſe alſo in Fortreſſes, eſpecially when the Beſeiged are conſtrayned to make cuttings off within a towne, or Fort: moreover they are good to be ſtruck in upon the topp of Breaches, whereof we will treat in the next chapter.

Theſe *Paliſadoes* then are made in this manner following, one makes choiſe of good and ſtrong *Sparrs* being ſome 3 or 4 ynches in *Diameter*, but of ſeverall lengths, according to the place into which they are to be ſtruck, whereof ſome of them may be 5; 6, or 7 foote long. Now the lower end of them muſt be sharpened and pointed, and the upper end flatt, that they may be driven into the ground with a mallet or a beetle: one bores alſo a hole ſome 3 or 4 ynches under the head of the *Paliſadoe*, and an other ſome three ynches under the firſt hole, and a third hole on the ſide through the middeſt of the two others, in ſuch ſort, that the nailes, which are driven through it, reſemble as it were the corners. In ſome alſo they uſe to driue in two nailes, ſo that they are not ſtruck in a right *Angle*, but riſes a little towards the head of the *Paliſadoe*. The length of theſe nailes, muſt be ſome eight or twelue ynches, and ſo bigg, that they cannot be eaſely bowed or broken, and the *Head* which is driven into the *Paliſadoe* is ſome-what greater, then that which ſticks out, which ought to be very sharpe.

When you are to uſe theſe *Sparrs*, whereof you muſt haue good ſtore, you take firſt of the ſhorteſt ſize, being but fiue foot long, and ſtrick in a long ranke of them, as you ſhall finde neceſſarie. They are driven into the ground the depth of a foot and a half, or ſometimes more, according as the Earth is conditioned, and thus you ſhall make your firſt ranke: then you ſhall driue in an other ranke of *Paliſadoes*, being ſix foote long, which are ſet behind the firſt ranke, to the end they may run in a right line with the firſt, but muſt be ſtruck in a little ſidelings, to the end, that their nailes may fill all places neceſſarie, and the heads of theſe *Paliſadoes*, ought to ſtand about halfe a foote higher, then the others: In the ſame manner you driue in the third ranke, which muſt be half a foot higher then the ſecond, and thus you may doe, if you will driue in a fourth ranke, yea as many as it pleaſes you. Theſe *Paliſadoes* are repreſented unto you in the 164 figure.

For the *Paliſadoes*, which are uſed againſt aſſaults there are two ſorts of them. The firſt is that ſort of *Paliſadoes* which are ſett upon the *Parapets* of Forts, *Outworks*, and *Redoubts*, for to hinder an Enemy that they may not ſo ſoone aſſault or ſcale a place: theſe ought to be 3 or 4 ynches in *Diameter*, and ſome 6 or 7 foote long, whereof the half paſt is driven into the *Parepett*, and the other half ſtands upright.

For the other ſort, thoſe great headed piles or pales, claſped together with chaines, and plates of yron, which ſtand alwaies upon *Rampards* and Bulwarkes covered with a little roof, againſt the time of neceſſity, when as an Enemy ſeekes to aſſault a Fortreſſe. For by this meanes he is repulſed, when he would ſcale a Rampard, becauſe theſe *Paliſadoes*, or logs

being caſt downe a wall, annoyes greatly the Beſeigers, in regard of their weight, which theyare not able to reſiſt, though they be armed with head peeces.

OF PALISADOES, PALES, VRIZ-RUYTERS, CAVALLIERS DE FRIZE,

Called in English Turne-piks

THE TENTH CHAPTER.

WEe haue obſerved in our declaration of Originall names whence, the *Cavalleries De Frize* tooke their name: to wit, at the ſiege of *Groeninghen in Frizeland*, where they ſerved for great uſe, by ſtopping and hindring the Enemies horſe, when they came to relieue the Town, and then got this name of *Vrize ruyters* in Dutch, *Cavalliers de Frize* in French, and *Frize Horſes or Turne-pikes* in English, and beſides the ſtopping of a ſuddaine charge of Horſe, they are of excellent uſe, to be clapt on the topp of a breach, or ſome weake place of a Trench, or a wall, and good ſtore of them ought to be carryed along with an Army on waggons, to be ſett up in ſome *Avenus*, or paſſages, to ſtop and hinder the ſudden attempt of an Enemy, when one hath no time to caſt up a trench.

In Fortreſſes they are alſo of greater uſe then chaines or Barres, which croſſeth the ſtreets. For a man may skip over a chaine, and a good Horſe will leap over it: But being beſet and croſſed with *Turne-pikes*, neither Foot nor Horſe are able to paſſe over them, ſeeing they have ſtaves and sharp points through them on all ſides. They may be ſet up alſo in the ſtreets of *Suburbs* and other places in ſtead of Barres, and where ſome broad places are to be kept, in joyning many of them together, which is done ordinarily in the expeditions of Warres.

They are made in this manner following, you take a tree of firme wood, which will not cleave, whereof the *Diameter* is five or ſixe inches, and ſome 10, or 14 foot long, which is made with ſix corners, ſo that it hath ſix ſides, and in the midſt of theſe ſides, one bores three or foure inches one from another croſ-wiſe, and then puts through theſe holes round Javelings, whereof the *Diameter* is an inch and a half, or at the moſt two inches, the length of them is ſixe or ſize foot, and ſo made, that they are all of one length, which are made of a ſtrong and a firme piece of timber, which will not eaſily bend, nor will be weakned by raine, theſe are thruſt through theſe holes, ſo that they are of a juſt length on both ſides, and have as many Javelings on the one ſide, as on the other: ſo that the *Turnepike* is alike over all, and falleth alwaies after one fashion, as it lies, and as one would have it. Both the ends of theſe Javelings are headed, and sharp pointed with yron, and the ends of the tree are plated about with rings of iron, that the tree of the *Turnepike* may not cleave, and in the middeſt of both ends there are rings and claſps made to tye two or three of theſe *Turnepikes* together with chaines, if occaſion ſhould ſerve, all which is repreſented in the 165 figure.

Where there are ſome *Banks* near unto a Fortreſſe or water, where Shipping may paſſe to and again, or where a water may be waded through, there are made pales or *Barricadoes*, repreſented in the 166 figure, which are made with Sparres of ſtrong wood, ſquared out, being ſome 4 or 5 inches big, and ſome nine or ten foot long, which are ſet between 2 great poſts, about 5 or 6 inches one from another, as ye may ſee in the 166 figure.

The foureſquare *Tanternailes* is a very neceſſary thing for defence, having alwaies one of the points ſtanding upward. For they have foure points as sharp as a naile, whereof three ſtands upon the ground, and the fourth howſoever it lies, ſtanding bolt upright. They are of divers greatneſſe, for thoſe which are commonly uſed in this Country, are leſſer then

thoſe

thoſe which are caſt into a Moate. The point whereof is 3 or 4, or 5 inches long. A Fortreſſe ought to have good ſtore of them for to caſt them into a moat, into a falſe bray, or upon a *Breach*, becauſe they do prick and hurt ſhrodly the Souldiers feet which ſtrives to enter. They are repreſented to you in the 167 figure.

Your *Dodanes* or *Beares* made of ſtone or brick are ſet upon a banke by a river ſide, to keep the water from overflowing, (or running out of a moat. The Dutches calls it a *Beare*, becauſe it repreſents the ſhape of a *Beare*, but the French terme it *des d'Aſnes*, and of one word corrupted *Dodanes*, that is, *An Aſſes back*, becauſe it hath ſome reſemblance of an Aſſes back, upon which diſobedient Souldiers, who committed ſome notable offence muſt ride upon ſome houres one after another, which we call in English a *Woodden horſe*, and hath the faſhion of an Aſſes back.

Maſter *Simon Stephens*, Prince *Maurice* his old *Mathematician*, in his new book of Fortification, and Sluces, makes mention of ſome great faults committed in the making of theſe *Beares*, becauſe the foundation, which ſhould ſuſtaine and beare up this *ponderous* Worke, ought to be exceeding ſtrong, and ſoundly laid, for otherwiſe the expence, and the labour which it coſts wilbe caſt away and in vaine. For the preventing whereof, he giveth good counc ill to ſinke into the bottome of the moate, piles or *Maſt trees* bound faſt together, and of one, and the ſame bigneſſe and length, which will make a ſtrong and a firme foundation, whereupon afterward you may build your *Beare*.

It muſt be made a good deale higher, then the water, when the tides, or the rivers are ſwolne up to the very bankes, and it muſt be made ſo thick, that it may be able to reſiſt the force and violence of the water, and the ſtones and brikes ſo laid and plaiſtred together, that the water cannot eate or ſoake through it. And becauſe theſe *Beares* in moates might ſerve as a way to ſtraddle over and get into the Towne or Fortreſſe by, at both ends there is two *paliſſadoes* ſett the one upon the *banke*, and the other one heither ſide next the *Moate*, as you may ſee in the 166 figure, before which alſo is ſtruck into the ground, many other ſmall *paliſſadoes* of 4 or 5 foote length before mentioned. But the toppof the Beare is made with a sharpe Edge, and in the midſt of it a little round *turrit*, to hinder, and keepe back thoſe that would clime over it: Some times there are made two round turrets when it is made over broad water or moate, the figure 168 will ſhew you the *pourtraiture* of ſuch a Beare.

OF RETRENCHINGS, OR INWARD CUTTINGS OFF, AND HOW ONE MVST RESIST AN ASSAVLT.

THE ELEVENTH CHAPTER,

Interiour.

THe Art of *Fortification* is not onely of perfect Fortreſſes, provided with all kind of *outward workes*, but alſo hath beſides an other uſe, ſeing that it teacheth alſo how one ought to prepare and furniſh a Towne or Fortreſſe with new workes, When the others are ruinated. This part of *Fortification* is called in French *un Retrenchement Interieur*, in Latine *Receſſus*, and in English *an Inward Cutting off*: becauſe ſuch works are made to no other end, but to make a Retrate into, when the others are loſt. For, when one cannot maintain, and defend a whole worke, or a part thereof, becauſe an enemie ſtriveth with all his power to become maſter of it, one muſt then reſolve, when he is driven out of one worke, how he may retire into another, and defend himſelf againe, againſt the aſſault of an Enemy, becauſe it would be very hurtfull to defend one ſelf, when he lies open to an Enemie.

This *Inward Cuttings off* is of two ſorts, the one in *outworkes*, the other in a *Fortreſſe* it ſelfe.

Beſides, it is in *Generall*, or *particular*.

Wee will firſt handle the Cuttings of which are made in outward vvorks, vvhich are the firſt, vvhich an Enemie ſeekes to take in, and afterwards the Cuttings off, vvhich muſt be made in a *Towne*, or *Fortreſſe* it ſelfe.

Touching a *Generall Cutting off*, it is onely uſed in *Crowne-workes*, *Horne-workes*, or *Tenailles*.

The ſame is alſo of tvvo ſorts *Regular*, and *Irregular*.

A Generall cutting off is, vvhen a vvorke is made in all things like unto that, vvhich is *cutt off*, in ſuch ſort, that a *Crowne-worke* is made vvithin a *Crowne-worke*, a *Horne-worke* vvithin, a *Horne-worke*, and a *Tenaille* vvithin a *Tenaille*.

Irregular cuttings off of outvvard vvorks is that vvhich is that vvhich keeps not the forme of the vvorke, vvhich is cutt off vvithin, yet nevertheleſſe ſhutteth up the vvork vvith a continued Parapet.

A particular cutting off is vvhen a vvorke is made out of broken vvorkes, or ſevered one from an other, in ſuch vviſe that there is made one, tvvo, or three *Ravelings*, in ſtead of a *Horne-worke*, or tvvo *demy-Bulwarkes*.

You muſt obſerve vvell, touching every kinde of cutting off here ſet dovvne, that they may have a good defence, and if it be poſſible, that they may alſo be defended from ſome other places, and that they lie open to that ſide vvhich lookes into the *Towne* or *Fortreſſe* beſieged.

A *Generall Cutting* off in *Crowne-works* is done as followeth, one falls backward ſome 20 or 24 foote, yea more or leſſe, according as the condition of the place is, and as neceſſity require, and one makes a worke within it, like unto the other which is cut off. And though his worke being cut off, is leſſer then the other, yet it will give an Enemy enough to doe when he ſhall attempt the taking of it in. Your *Crowne-workes* are made commonly after the proportion of a ſmall *Fort Royall*, where the proportion of the *Polygones* are of 55, 50 or 45 rodd: When you reſolve to cut off a work a little more inward, it will become narrower, in a regard of the great work, yet will be great enough to defend it ſelf.

The Generall Cuttings off of *Crowne-workes*, will coſt no great labour, which may eaſily bee ſhowne, in regard it is very common. An exſample thereof you may ſee in the 169 figure: The cutting off being made, one is forced to make a ditch, between the worke quitted,

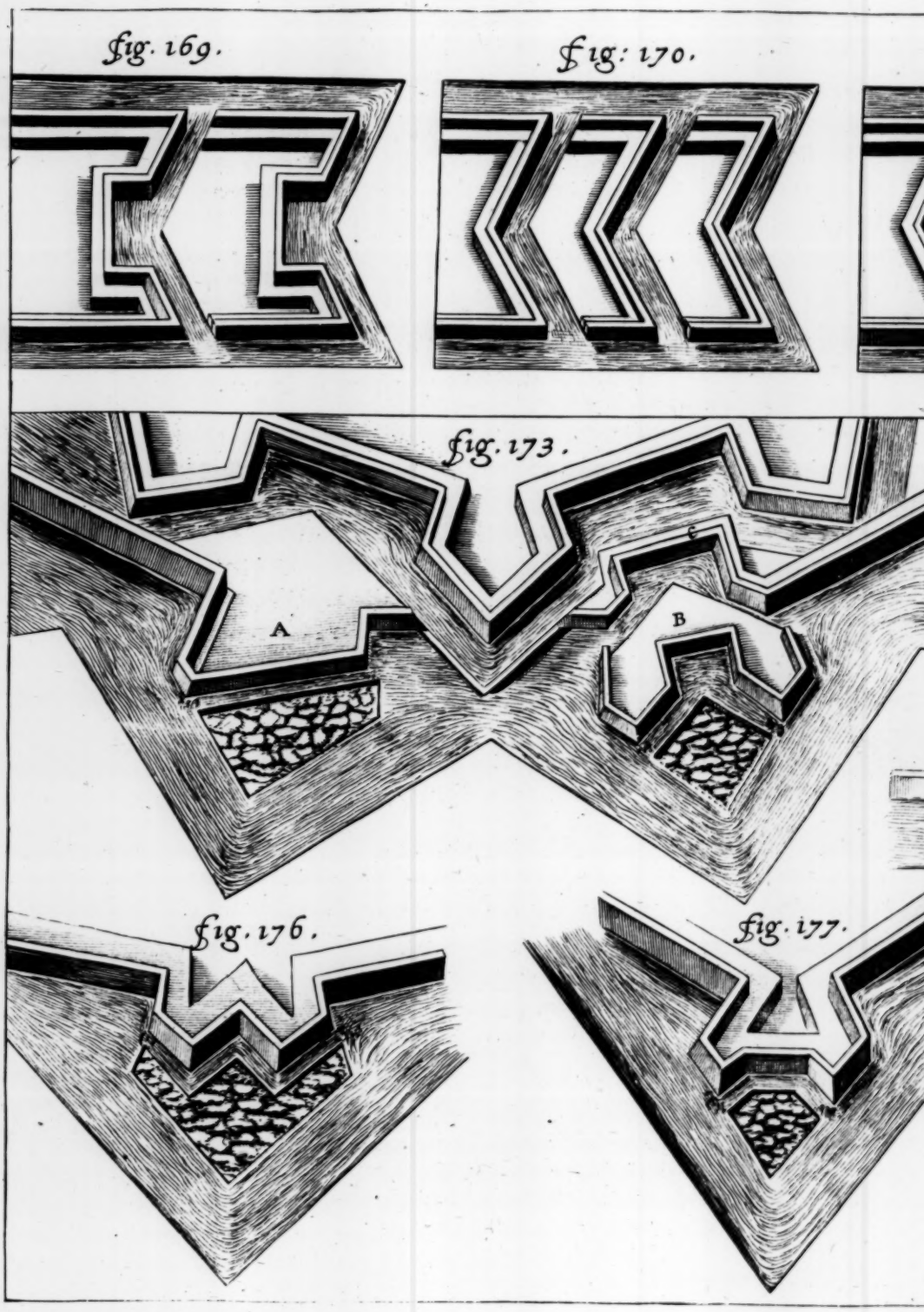
fig. 169.
fig: 170.
fig. 173.
A
B
C
fig. 176.
fig. 177.

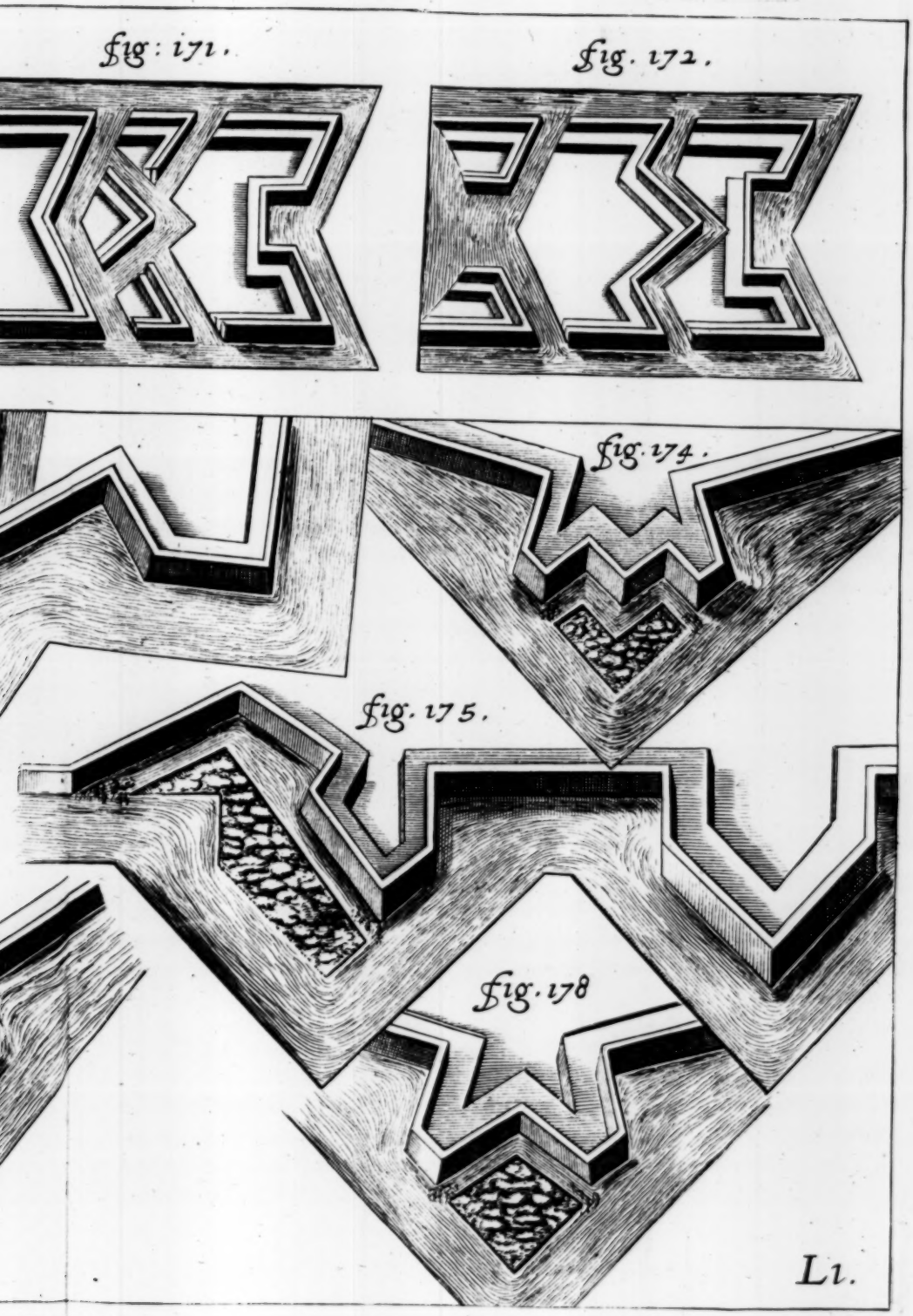
fig: 171.
fig. 172.
fig. 174.
fig. 175.
fig. 178

ted, and the cutting off, which ought nevertheleſſe to be done, becauſe one takes the Earth out of the *ditch*, to make up the cutting off withall: one muſt obſerve alſo, that this cutting off muſt be made, as ſtrong as poſſible may be. The cuttings off are not made only, while an Enemie is approching towards you, but alſo when Towns and Forts are firſt fortified.

Your Generall cuttings off in *Tenailles* doth not differ from that which is made in *Horne-workes*, ſaving that one make a *Tenaille*, in ſtead of a *Horne-worke*.

The particular cuttings off of *Horn-workes* is after ſo many waies, that one cannot ſhew here all the kindes of them. A Cutting off is repreſented unto you in the 171 figure, where a *Horne-worke* is cut off, and two *Ravelings* made in the ſides of it, which are defended by a third, which is behinde the others: and though they have a ſufficient defence of themſelves, yet the defence of the other Raveling is added to them over and above, and is defended from the *Tenaille*, which is after it.

Beſides this, there is an other kinde of cutting of a *Horn-worke* showne in the 172 figure. In imitating theſe cuttings off one may make many others, as neceſſity may permit, and as an Enemy attempts upon you, all which is impoſſible to marke out here.

A Generall Cutting off of a great *Wall* or *Rampard* is uſed very ſeldome, becauſe the Beſeigers, and the Beſeiged will at laſt grow weary thereof. Nevertheleſſe, this hapned in the ſeige of *Oſtend*, which laſted three yeaes, three months and odd dayes: for aſſoone as the Enemy had got into the wall by ſapping and ſpringing of mines, they preſently had an other Cutting of ready to entertaine them: in ſo much that during this ſeige, there were many *Counterapproches* againſt approches, *Countermines* againſt the Enemies mines, ſo that the Enemie could not get for a long time ſcarcly an inch of ground upon our men, for there were above fourty mines ſprung on both ſides, and when the Earth fell our men fought for that and turned up the earth againſt them, for theſe Generall and Royall cuttings off laſted, till the enemy had got more then halfe the Towne, before they gane over the whole. And though ſuch a *ſeige*, and ſuch a great cuttings off happens but ſeldome, yet you ſhall ſee an exſample thereof in the figure 173, where is ſhown how one ought to quit a whole part, of a Towne, or Fortreſſe, with the *Curtaine* and Bulwarks, and how one by a cutting off a *Bulwak*, or a *Curtaine* is more uſuall, whereof wee ſaw an exſample at the ſeige of the *Boſch* in the *Vuchter* Bulwarke, as alſo the laſt yeare at the ſeige of *Breda*, where both the *Ginnekeis* and *Hagelſ* *Hornworks*, with both theſe *Bulwarks* were moſt dangerouſly cut off. Now to repreſent unto you ſome cuttings off, which you may ſee in the 173 figure, marked with A, B, and C. The letter C ſhowes you how one ought to quit a whole *Bulwark*, and how you ought to make your *Capitall line* after a Bulwark is cut off.

Likewiſe other kinds of cuttings off of *Bulwarks*, are repreſented unto you in the figure 174, 175, 176, 177. and 178, after which manner, you may make many others, and change, and order them, as an Enemie comes neere you, and as the commodiouſneſſe of the place ſhall require.

It happens alſo ſometimes, that *Curtaines* are cut off invvardly, which as an Enemy may aſſault them with advantage, becauſe of their length. You may then cut them of as is showne in 173 figure, when you have time enough to cut them off *royally*. But if time will not permit you to make a royall fortification, then you muſt make uſe of *Traverſes*.

It is impoſſible to cut off a *Falſebray*, becauſe of the little ſpace, which is in it. Notwithſtanding one may caſt up ſome *Traverſes* in it, eſpeciall on that ſide, which the Enemy ſeeks to take in, and towards which part he would advance his gallery, to the end, you may not give too much to an Enemy, but keep and maintaine the place, as much as poſſible may be. For the *Beſeiged* may lay hold on the ſame advantage, as their Enemy doth, when he is once got into the *Falſebray*, and though when he is in that, they may cover the roofe of it with planckes, one may nevertheleſſe, ſet fire on it, and defaccommodate the Enemy on all ſides.

As for other workes as *Ravelings*, and *Halfmoones*, you may ſee how they are cut off after the ſame manner, as the Bulwarks are, if the worke which is to be cut off be great enough, and have place enough in it to be cut off.

But for aſmuch as all this here showne, concerneth principally the defence, which ought

to be considered in all ordinary Fortresses, so one must have a speciall care to the *materials* whereof these workes are made: for in making of them, you must choose the best Earth that is to be got, which will make your vvorks the stronger.

In outworks you may alwayes rake in the Earth, which is digged out of the moate. But because that sandy earth, or Earth mingled with sand, is not so good, it is lyned with rise, or Brush, which is layd betwixt and upon it

In great *Bulwarkes*, where there is not Earth enough and besides that is sandy it must bee layd with rowes of Brush, driven them in with stakes and sparres of houses shot down with canon. But when the ground is so sandy, that you cannot worke it alone, then you must lay dung, and straw, and other things betwixt it to make it hold together, and you must wet the Earth, as many times as is needfull. You may fortifie your *parapets* with *gabions*, when you cannot make them otherwise, and likewise you may sett great *musket baskets* upon the top of the *parapet*, that it may be covered the better.

In *outworkes* one may make use of the ordinarie *profile* when you have time enough to make cuttings off, or you may make them long before hand. But the works which are made in great hast, have no certaine rule: howsoever, you must make then as strong as possible may be, and as meanes, and time will give you leave.

Touching the cuttings off of *Bulwarks* and *Curtains* one can give likewise no certain rule. Onely this you must ever have a care, that all inward works, & cuttings off lie open towards the *Towne* or *Fortresse*, with this *proviso* also, that they be not made so high, but that the great works may over look and commaund them: For, if the *Rampard* of the cutting off be lower then the high *rampad* of the Towne, then the Enemies canon can do it no great harme, because they are defended from the great *rampard*. Againe, the Enemy cannot discover the place and the forme of the cutting off, according to which one may governe themselves otherwise. It is certaine also, that one cannot beare an Enemy from a high place, which is neere at hand, because he is blinded and covered with the wall or *rampard*.

All these things being finished, when one is assured, that an Enemie is ready to spring his *Mine*, which cannot be found out, one must then strengthen, and double the guards in every place, and bring your canon to those places, where they may most gaule and flanck the Enemy. One ought to have an eye, aswell on other places, as onely upon the *breach*, which is made by the springing of the mine. For an Enemy hoping that he may have drawn, the most of the forces in a Town or Fortresse to defend the *Breach*, may attempt some other place of the Fortresse, which is not thought upon, and so become master of such a place, which is not provided with a sufficient defence.

After that the *Breache* is made, the *Besieged* must expect to be presently assaulted, which they must maintaine, and make good as long as possibly they can by defending the breach courageously, in doing whereof, they must throw downe from the top of it abundance of these *square tanternails* spoken of in the chapter before, for to annoy and prick the Enemy, when he seekes to mount up and to enter it.

Upon the top of the *Breach* also, if they have time they may cast up a brestworke, as Sir Francis Vere did in Ostend, or set up some turn-pikes, to hinder the enemy for entring, and to strike in some *pallisadoes* upon the top of it, having *clubbs*, *flayles*, stones and ashes to offend them.

It is necessary, when the Enemie strives to enter it, that the souldiers fight courageously, & that the officers should encourage them with their presence to carry themselves like brave men, that being a place to gaine honour in, by giving them also promisses of reward, and when they grow weary, to see that they be seconded with fresh men, which stand in a readinesse behinde the *Rampard*, to relieve them.

When they are not able to maintaine and defend the breach any longer, then they must retire into the *cutting off*, and take a new courage, and a hart of grace in fighting behinde a new Rampard, in making resistance as long as ever they are able.

A BRIEFE

A BRIEFE,

Diſcourſe of *Cavallerie*, or horſemen, with the ſeuerall chiefs, and Officers commanding ouer them.

HAving treated in the firſt part of this booke of a foote Companie; and the diverſe Officers belonging to it, and in this ſecond part of the chiefe Officers of the Feild: it reſteth now to ſpeake ſomething of a troupe of Horſe, and the Officers, which haue charge, and commaund ouer them, as alſo of the chiefe Officers of the Feild; who haue commaũd ouer the horſe, which I will doe, as briefely as poſſible maye be.

A troupe of horſemen then, according to our moderne warres (for now *Lanciers* are growne out of vſe) may conſiſt, either in a troupe of *Curaſſiers* (heavely armed, having the ableſt & ſtrongeſt horſe) *Carabines*, or *Harquebuſiers* called with vs *Light horſmen*.

A *Curaſſier* is armed as it were (*de Cap en pied*) at all points, with a paire of good piſtolls hanging at his ſaddle bow, to be drawne out vpon all occaſions. A *Carabine* with a lighter Armour, and a Cask with a long peece, or fire lock hanging in a ring at his belt. A *Harquebuſier* likewiſe is light armed with a paire of Piſtols.

A Troupe of horſe, at the firſt levying or raiſing, is formed of able and luſtie horſemẽ and gentlemen, whoſe bodies are able to endure the fatigations & hardship of warre, for their princes, and Countries ſervice. The Officers commaunding ouer a troupe are theſe videlz. 1. A *Farrier* or a *good Smith*. 2. *A Fourrier or a Clark*. 3. *Two Trumpetters*. 4. *Three Corporals*. 5. *A Quatermaſter*. 6. *A Cornet*. 7. *A Lieutenant*. *and* 8. *a Captaine*, which make in all eleuen officers to a troupe; whoſe ſeuerall entertaynments, and payes are annexed to the concluſion of the firſt part.

As a foote Companie, ſo maye a troupe of horſe alſo be ordered into *Rankes*, and *Files*; having a *Leader*, Two *Middlemen*, and a *Bringer* vp of a file. The files of the Horſe are to be noe more then ſix men deepe: but in front, as large as the ſtrength of the Company will beare: Suppoſe the Troupe to be a hundred ſtronge, which is the ordinarie foote of the States Companies, you maye then drawe them, if ſo be the Troupe be compleate into 15 *files*, and ſixe rankes, which will make 90 men beſides officers.

The ſame *words of Commaund* for the exerciſing of a foote Companie, maye alſo be vſed in the exerciſing of a troupe of horſe, & by obſerving the like diſtances, of cloſing, and opening, as the foote doe, in *Open order*, *order* and *cloſſe order*, with their diverſe motions to the right, or left hand, or to either hand about: as alſo doubling of *Rankes* and *Files* to either hand, or on the flankes, doubling of the front, Countermarching to both hands, and giving fire vpon an Ennemie, either by rankes or by files, from the *front*, the *Reere*, or the *flankes*, as the diſcretion of the officer ſhall finde fitting: but the chiefe ſervice of a troupe, or deviſiõ of horſe in a day of *battell*, or vpõ any other ſuddaine ſervice is by *wheeling* in their cloſſe order, and finding out the *advantage* of a charge vpon a deviſion, or ſtand of pikes, which vnleſſe they ſtand firme, to receiue the charge, maye eaſely be broken, and routed by the horſe.

Of the Duties of Horſmen, from the Inferiour *to the* ſuperiour officer of a troupe of Horſe, and firſt of a private ſouldier.

THe dutie of a *Horſeman* conſiſts principally in the readineſſe of his horſe, the neate keeping of his armes, his valour vpon ſervice, his orderly marching, and his vigilencie vpon his watch and ſentinelship, the further duties concerning a private ſouldier, or a gentleman, are diſcribed at large in the firſt part of *the Principles of the Art Militarie*, which for brevities ſake I will here paſſe ouer.

Of the Farrier or a Smith.

His dutie is to drench, to let blood the horſe, and alwaies, either vpon a march, or in a quartier, to haue in a readineſſe his bugget of tooles, horſe shooes, and nailes, whenſoeuer he is called vpon by his Officers, or any ſouldier of the troupe, for this reaſon he is freed from dutie, and hath a greater pay then a private horſeman.

Of a Trumpetter.

A troupe ought alſo to haue two good Trumpetters, who can ſound a call to horſe back, a march, a *Reveille*, and a retreate, he is often employed, and ſent by the Generall with Lettres, for the releaſement of priſoners, where being with an Ennemie, he ought to carrie him ſelfe wiſely, and reſervedly, and not to diſcouver any thing, that might be prejudiciall to his princes ſervice.

Of the Clarke to a troupe of horſe.

The next degree vnto the Trumpetter is a Clarke, or as ſome cals him the *Fourrier* of the troupe, whoſe office and dutie is, to fetch moneys, to pay the officers, and ſouldiers duely, to procure their billets, or lodging moneys, and to deale vprightly, and juſtly with them.

Of a Corporall.

A troupe of horſe (as a foote Companie) is alſo devided into three *Squadrons*, having a *Corporall* ouer each ſquadron, whoſe dutie is, to keepe a roule of the names of euerie man of his ſquadrō, to cauſe them to keepe their horſes in a readineſſe, to ſee that their armes be kept in good trime, and their piſtols and Carabins fixe, when they ſhall come to vſe them, to be carefull and vigilent vpon his watch, to ſee that the ſentinels doe their duty well, and that they be duely relieued, and well exerciſed vpon their guards, or in orher places: to helpe, and to be an *Aſſiſtant* vnto his Lieutenant, by preventing of factions, and diſorders, and by compoſing of quarrells, and diſputes amonge the horſemen of his ſquadron, yea, to doe whatſoeuer elſe belongs to a worthy Corporall.

Of the Quartermaſter.

Euery troupe hath alſo a *Quartermaſter*, to ſee that the troupe be well lodged, both in garniſon and feild, eſpecially, when they are ſeperated and quartered apart from the Armie in villages, and houſes, his dutie alſo is to attend the *Quartermaſter Generall*, and to receiue from him ſuch houſes, as he doth aſſigne him, after which he diſtributes thoſe howſes to the Companies, according to their *ſeigneuities*. Alſo he is often employed in in fetching of orders, If the Regiment, or troupe be quartered about, or in the armie, then he is to follow that order and forme, as is showed in the figure, and demonſtration of a Regiment of horſe, and the quartering of a troupe, as is aforeſaid.

Of a Cornet.

A *Cornet* ought to be a braue yonge Gentleman, full of ſpirit, and courage, & though he hath noe great experience, yet time and ſeruice will learne it him. He is choſen ſoe, becauſe he maye be capable of his place, and the charge Committed to him from his Generall, and rather vpon any peece of ſeruice to looſe his life, then his reputation. He ought alſo to carry himſelf amiably, and affably to the ſouldiers, and gentlemen of the troupe, whereby he ſhal gaine their loues, and affectiō, who wilbe ready vpon any occaſiō, to hazard their liues for him, and for that badge of honour, which he carries. A *Cornet* alſo in the abſence of his Captaine, and Lieutenant, hath commaund ouer the troupe. The *Cornet* ſometimes marches in the head of the troupe, but the troupe being embattailed, he marches betweene the third, and fourth ranke for the better garding of his *Cornett*,

Of a Lieutenant.

It is neceſſarie that a *Lieutenant* to a troupe of Horſe, be an able old ſouldier, and well experienced, who hath shewne his valour vpon diverſe peeces of ſeruice, and ſoe by his deſerts hath raiſed his fortune from inferiour degrees, as from a *Corporall*, from a *Cornet* &c. to this charge. He is a good helpe, and agreat Aſſiſtant to his Captanie, and therefore beares the name of *Lieutenant*, who in the abſence of his Captaine hath abſolute Commaund ouer the troupe. It is his office alſo, to prevent and Compoſe quarrels, and diſputes, ariſing among the horſemen, and to cartie a ſeuere hand ouer willfull, and obſtinate offenders, by punishing them ſoundly for the exſample of others. He is to countenance and fauour thoſe that carrie themſelues worthely, and to diſcountenance the others, till they are ſorrie for their diſorders. He is to giue charge to the *Corporals* and inferiour offieers, that euery man keepes his horſe in a readineſſe, their armes cleane and their piſtols fixe. His place is to bring vp the *Reere* of the troupe, cauſing the *Horſemen* to follow their Captanie and *Cornet* in good order, that they keepe well their *rankes*, and *files*, and to haue an eye, that none of them ſtraggles out of the troupe.

Cōming to fight, either in *skirmiging*, or otherwiſe, when his *Captanie* and *Cornet* giues the charge, he keepes himſelf in the *reere* with his ſword drawne, to animate and encourage the ſouldiers to fall on, and if any of them should play the Cowards, or breake out and run away, if he kills them they haue the amends in their owne hand, and the *Lieutenant* may anſwere it: for ſuch a faint-hearted ſouldier, maye show the way for others to runne, which maye be the overthrow of the troupe. His duty alſo is to viſite the gards, to ſee that the ſentinels diſcharge their duty well, and to giue commaund to the *Corporalls*, that they be duely relieued. That vpon the ſight of an Ennemie, they come in orderly: and giue the *Alarme* betimes, that the troupe maye draw into armes, & be provided to entertayne them, or haue leiſſure to retreate to ſtronger forces. A *Lieutenant* ought alſo to be a good *Guide*, and to know all *Avenues*, and paſſages in a Countrie, aſwell by night as by day.

Of a Captaine.

THe Commaund and charge of a *Captaine* of a Troupe of horſe is honorable, and it ought to be giuen to a man of great reſpect and quality in a Armie, many of them being deſcended of a noble birth; and their valour, and worth anſwerable therevnto. He ought alſo to be religious, fearing God, temperate, juſt, continent, moderate, wiſe and diſcrete curious in the choiſe of his horſe, cauſing them to be well managed & his troupe well exerciſed, vailliant vpon ſeruice, vigilent vpon his watch, cherishing the Good, & punishing the badd: all which *vertues* will gaine him honour, and reſpect, not onely from the troupe, which he Commaunds: but alſo from all men beſides.

Contrariewiſe, he muſt not be *debauched*, not giuen to *Covetouſneſſe*, or *Lucre* of gaine (for a Captaine of all men ought to be *liberall*, and to deale juſtly with all men, which is one point of his *honour*, neither by an intemperate and diſorderly liſe, to giue an ill exſample to thoſe whome he Commaunds, for if he commits ſuch things himſelfe, how can he faſten a *reproofe* vpon his ſouldiers, or how can he with a good *Conſcience* punish that offenſe in a ſouldier, whereof hee himſelfe is guilty: for ſurely a Captaine that governers, himſelf well (being the head of a Companie) and liues vnblamebly, giues a good exſample both to his inferiour officers and ſouldiers.

Moreouer, he ought to giue reſpect, and obedience to his *chiefe*, & ſuperiour officers, and to execute their commaunds with wiſedome, courage, and diſcretion, not ſuffring the horſemen of his troupe, to *ravage* the Countrie, or to pillage, and plunder the poore *Boores*, & contributaire *Peſants*, contrarie to the *proclamations*, and orders of the *Generall*, and ſo by his worth, and valour, maye aſpire to a higher Commaund, which his ſeruice and vertue shall merit.

Of the Quartermaſter Generall.

The *Quartermaſter Generall* of the horſe, hath the particular Quartermaſters of euery troupe as his aſſiſtants to eaſe him, and to helpe him to diſcharge his place, either when the troupes are lodged in *howſes*, or formally quartered in the feild, from him they reciue their orders, and billets for their troupes, chaulcking the name of their Captaines vpon the doores of euery howſe, where the troupe is to lodge. The further duties required in a *Quartermaſter Generall*, are deſcribed in this ſecond part, in ſpeaking of the Quartermaſter Generall of the foote.

Of the Commiſſarie Generall.

The *Commiſſarie Generalls* place ought to be giuen to a ſouldier of great experience, who hath bin bred vp in the warres, being a man of *valour wiſedome* and diſcretion: in a Commiſſarie *Generall* is required alſo *vigelencie*, *dexterity* and an ability to cōpoſe Quarrels, and punish dis orders which maye ariſe betweene officer and officer, ſouldier and ſouldier, what he cannot doe by faire meanes, he hath power and authority, ſufficent to punish them. It is alſo his dutie to giue out orders, to appoint guards vpon *avenues* and paſſages, to keepe a liſt of all *guards*, *Convoyes*, and other *actions*, to receiue orders from the *Generall*, or the Lord *Marſhall* of the feild, to giue it firſt to the *Generall* of the horſe, and afterward to the Quar-

termasters of the troupes, that they maye giue them to their Captaines and superiour officers: also to range, and embattaile the horse in that forme, and order, wich his Generall, or Lieutenant Generall shall finde good, in whose absence he commaundeth the horse.

Of the Lieutenant Generall.

The *charge* of a Lieutenant Generall of the horse is of great authority, and reputation, and therefore he ought to be a man of great experience, valour, and wisedome, carefull, and diligent for the well ordering of the troupes, becausse he commonly marches with them, and lodgeth among them. He must haue knowledge of the waies, and passages through Countries, and choose the best waye, least meeting with an Ennemie, lying in *Ambuscado*, upon a march he maye giue him a blowe. Therefore, he must alwaies haue his minde buysied vpon the motions of his Ennemie, discovering from what part they maye annoye him, be it either foote, or horse; in how many howers they can march vnto him, by what passages they maye assault him, to send out *Scouts* and *Spies* to giue him true intelligence, that he maye be provided for them, against some suddaine attempt. To giue encouragement to officers and souldiers in the day of battell, to carrye themselues brauely, to charge home, and to finde out all advantages, to breake and route their Ennemie. He ought not onely to carry himselfe lovingly to the souldiers in hearing them willingly: and assisting them in their necessities, but also to punish offenders seuerely, which will make him to be both feared, loved, and respected.

Of the Generall.

The *Generall* of the horse is one of the principall *chiefs* of an Armie, who ought to be a souldier of great experience, and valour, & for the most part a personage discended of a noble *familly*. Yea a man of a high spirit & commaund, for vnder his charge are the *sinewes* of the principall forces of an Armie, from whose magnanimity, valour, & wisedome poceedes many times good successe, when occasions are offred, which are for the most part executed by the horse, especially in the day of battell, who charging in good order vpon an advantage, maye happely rout an Ennemie, and get the victorie, wheras contrarie wise, by the diforders of the horse, it maye breed great confusion and losse of men.

The *Generall* of the horse ought to take perticular notice, not onely of the *Captaines* and officers, but also of euery gentleman and souldier that carries themselues brauely in the face of their Ennemie, and to honour and respect them in publick, which will encourage others to do the like, and when occasiō presents it selfe, to advance them to military charges. Contrariewise to punish *Delinquents*, and such as doe not their endeavour, in doing whereof, he shall be honored, loued, feared, and respected of all men: last of all, by his high commaund, he giues commaund for the due exercising of of his troupes, and helps in them their necessities.

To conclude, the proportion, or *grosse* of the States horse, answerable to their foote; consists in eighty troupes of horse namely *Curaſſiers*, *Carrabins* and *Harquebusiers*, two Companies of *Curaſſiers* and two Companies of Harquebusiers being joyned together, according to his highnesse order make a *battaillon* or a *Devision*; These also being formed and ordered into ten Regiments, maye be drawne as the foote are into three *Brigades* or *Tercias*, making the *Avantgard* the *Battle* and the *Reere*, as yow see them ranged in the first figure, by observing their true distances.

What a goodly show it is, to see these 80 troupes of Horse drawne into three *Brigades*, the *Generall commanding* in the head of the *Avantgard*, the *Commissarie Generall* in the *Battell* & the *Lieutenant Generall* in the *Reere*, being brauely mounted, well armed with their skarfes, and 160 Trumpetters sounding *Tantara* in honour of their prince, and Countrie I leaue it to the report of those, which haue seene it.

Also of what excellent use, and seruice horse maye be off in the day of *battel*, for the breaking of foote, as also vpon *execution*, for the cutting off of *Convoyes*, gayning of *passages*, aud the beating in of an Ennemie salying out of a Towne *beseiged*. I will leaue to the testimonie of *historie*, and here wil I shutt vp this second part.

FINIS.

THE THIRD PART OF THE PRINCIPLES of the Art MILITARIE

practiſed in the warres of the

UNITED PROVINCES,

vnder the

LORDS the STATES GENERALL,

and his

HIGHNESSE the PRINCE of ORANGE,

Treating

Of Severall PEECES of ORDNANCE, CARRIAGES, ENGINES, QUADRANTS, MORTERS, PETARDS, as alſo INSTRVCTIONS for MASTER GVNNERS, and CANONIERS, with diverſe INSTRUMENTS, and MATERIALS belonging to a warre with their ſeverall vſes, and practiſes moſt briefly, and lively demonſtrated by letter and FIGURE.

Together with a List of all neceſſarie preparations, appertayning to an Armie, with a quarter for the Generall of the Ordnance, and of all Officers belonging to his Traine.

VVritten and Compoſed by CAPTAINE HENRY HEXHAM, *Quarter-Maſter to the truely honorable Colonell* GORING *his* REGIMENT, *for the Lovers of the Noble Art Militarie.*

Printed at the Hagh in Holland,

By FRANCIS *vander* SPRUYT, *dwelling in the Poote.* ANNO 1640.

TO

HIS HIGNESSE
CHARLES LODOWICK,
PRINCE ELECTOVR,

Count Palatine of the Rhene, & Duke of
Bavaria, &c.

SIR,

AFter I had travelled through the World in *Speculation*, by translating, and augmenting of *Atlas Majour* in Englisch, dedicated to his most excellent *Majestie* your Uncle, and my dread *Soveraigne*; I could give noe rest vnto my thoughts, till I had vndertaken some thing of my owne profession, which might give light, vnderstanding, & Instruction, vnto some young Gentlemen, Souldiers, and others, who desire to followe the warres, and to studdie this *Art Militarie*, for their princes seruice, and the good of their Countrie. And where could I finde a fitter place, or a better *Subject* to work vpon, then in these United Provinces, vnder the Commaund of the *Lords the States Generall*, and his *Highnesse the Prince of Orange*, which now in regard of their long warres, maye truely be called a *Nurcerie*, and *sedes belli*, for the breeding, and trayning vp of Souldiers, and verely how could I doe better, then to beginn *ad principium*, with the very first *Principles*, and *Rudiments* of the *Art Militarie*, practised in these warres, vnder the Commaund, first of *Prince Maurice of blessed Memorie*, and now vnder the able *Conduct* of that great, and victorious Captaine Generaell of our age, his *Higneſſe the Prince of Orange his Brother*. Now besides what experience my longe service hath gayned vnder their Commaund, for the space of fortie yeeres, as an addition there vnto, I have gott Some translations, and extracts out of the best, and *choisest Authours* of our moderne times, who have writ vpon this subject, to give *Lustre* vnto yt, and having before by the assistāce of God, run through the first two parts: I have now also finshed my third part, concerning all *preparations*, and *necessaries* appertayning to an Armie, and so to put an endunto this *Laborious* worke. For in my first part, I promissed the Right honorable the *Earle of Holland*, and in my second part my *noble Colonel*, that I would goe through the three whole parts, for the arming of a Souldier, *de Cap en pied*, that is, at all points, which now thanks be to God, I have done, to the end, that such as maye goe into his maiestis service, your Higneſſes, or any other forraine State, or Princes, maye gaine some experience, and reape some benifit by my labours, which is, and was the *principall* thing I aymed at, For I hope as ould as I am, when these

vnhappie differences at home are reconciled, appeased, and Composed, that God, who *leades the hearts of all kings in his hand, as the Water of brookes* will so direct his *Majesties* heart for your right, that his *Maties.* will assist your Higneſſe, & turne his powerfull armes an other way, and make your Higneſſe *Generall* of a brave *Brittish* Armie, for the *vindicating*, of your *iniuries*, and the recouverie of your lawfull, and ancieent rights, and inheritances agàinſt the *Uſurpers* thereof.

I will not trouble your Highneſſe any longer with a teadious diſcourſe ſeeing my ſelfe, & thowſandes of true hearted *Brittans* beſides my ſelfe, (when ſoeuer his *Sacred Matie.* and our dread *Soveraigne* shall lay his *Commaunds* vpon us) shalbe all willing, to fight in ſo juſt a quarrell, for your Higneſſe, and laye our liues downe at your feete, and your queene mothers, for the regaining of your Higneſſes rights, and Countries.

This third part then of the *Principles of the Art Militaire*, comes in all humililtie, to preſent it ſelfe vnto your Highneſſes *gracious patronage*, that though it be meane in it ſelfe, yet it craues to come forth to the view of the World, vnder your *illuſtrious* name, which if it maye be *acceptable* vnto your Highneſſe, then I shall think my weake endeavours happily ſacrificed, and acknowledge my ſelfe much obliged to your Highneſſe, and shall not onely be bound to pray vnto the *Lord of Hoaſts*, to honour and bleſſe your proceedings here in this World with happie Suc ceſſe: but alſo to crowne yow, your *royall mother the Queene of Vertues*, and her princly *progenie* with eternall *felicitie* hereafter, beſeeching your Higneſſe to beleeve, that noe creature living shall more heartely fight, nor more willingly dye in your ſeruice then,

Sr.

Your Highneſſes ever moſt humble,
obedient, and devoted ſervant.

HENRIE HEXHAM.

TO

The right honorable and moſt noble Lord.

MOVNTIOYE

Earle of Newport, Generall (or Maſter) of the Ordnance of England, &c.

My Lord,

It maye ſeeme ſtraunge vnto you, that I who am a ſtraunger vnto your Lordship, and one that lives in a forraine Countrie, should preſume to dedicate this *Tract* to the honour of your name: But when I conſider two things, it maye challeng ſome excuſe for me. The firſt is, that my noble *Colonell*, who honours & loues your Lordship did adviſe mee therevnto. The ſecond is, becauſe it treats of that honorable *Charge*, and *Superintendencie*, which properly appertaines vnto a *Generall of the Artillerie* wherewith your Lo: is inveſted, as alſo the *Subordinate* Officers vnder your Command. Such as it is, I beſeech your Lo: to accept from an ould Souldier; And as in theſe Countries where I live, I have dedicated it to his highneſſe the *Prince Electour*, who hath graciouſly accepted of it: ſo it comes in moſt humble wiſe to craue your Lo: favourable *Patronage* to it in my *native Countrie*, which if it pleaſe your Lo: to vouchſafe of it, and that it may goe vnder your honorable name and protection, and ſo come out to the view of the World, with my Lord Marshals warrant, & licence in the *Frontiſpice* thereof, I shall think my weake labours and endevours vpon this ſubject wel employed, with hopes that it maye prooue vſefull and give ſome inſtruction to thoſe who are deſirous to ſtudie this noble Art, and shall not onely pray vnto the Almighty to preſerve your Lo: in health, with much encreaſe of honour in this World, but alſo to crowne yow with eternall felicitie hereafter reſting.

Your honours devoted ſervante ever to Commaund.

From Delff in Holland this 20th. of November 1640. Stilo novo.

Henry Hexham.

AN

Authentick Coppie of my Lord Marshall his VVarrant

graunted to Henry Hexham Quartermaſter to the Regiment of the honorable Colonell Georg Goring, in the ſervice of the States Generall of the Vnited Provinces, vnder the Command of his highneſſe the Prince of Orange their Generall.

THomas Earle of Arandell and Surrey, Earle Marshall of England, *&c.* Whereas Henry Hexham *Quartermaſter to the Regiment of Foote vnder* Colonell George Goring, *in the ſervice of the* States Generael of the Vnited Provinces, *hath by his great labour, experience, and long obſervation, collected and ſince cauſed to be printed the three parts of* the Art Militaire practized in the Warres of the Vnited Provinces, *which though of much vſe, and very neceſſarie: yet ought not to be expoſed to publick ſaile, without my particular* Licence & approbation *in perſuance of the order of the high Court of* Starr-chamber *to that effect: all which I having taken into conſideration, and being humbly deſired by him to graunt my* Warrant, *not onely for* importation *of them; but alſo for expoſing them to* ſaile, *I haue thought fit for the reaſons abouesaid to condiſcend therevnto, and doe therefore by theſe charge, & require all perſons whatſoeuer whome it maye concerne, quietly to permit, and ſuffer him the ſaid* Henry Hexham *by himſelf, his* Factours *&* Agents, *without any their lett, hindrance, or moleſtation not onely to shipp, & import the ſaid Bookes into this Kingdome; but alſo be brought to expoſe, & put them to publick ſaile, for his beſt advantage, he paying all ſuch* Cuſtomes, *& other* duties, *as for ſuch goods hath formerly bene vſed and accuſtomed. This* Licence *being to continew to him, and his* Aſſignes *for the ſpace of one whole yeare from the date hereof, of which you are all required to take notice, and to be obedient therevnto, as yee will anſwere the contrarie. Given vnder my hand, and ſeale at Arandell howſe the 23th. of October* 1640. *And was ſigned*

Arandell & Surrey.

To all Cuſtomers, Searchers, Captaines & Maſters of Ships, Majours, Baylifs, Maſters and Wardens of the Companie of Stationers of London, and all other his Majeſties Officicers, and loving Subjects, whom it maye, or ſhall concerne &c.

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BRIEFE TREATISE

of eight ſeuerall peeces of Ordnance, as they are founded vnder the Commaund of the Lords the States Generall of the Vnited Pro-vinces, with their appurtenances, carriages, Engines, together with Morters and Petards, quadrants, and Inſtruction for Maſter Gunners, and Canoniers With diverſe other Inſtruments & materials belonging to the Warres, With their ſeuerall vſes, and practizes demonſtated.

The firſt Chapter.

Treating of the Leagues, Alligations, and Commixture of mettals, wherewith Ordnance are Caſt, and made in theſe Countries, and elſe where.

THe *Alloye* wherewith our Ordnance is made here in theſe Countries, is commonly old caſt *braſſe peeces*, ill proportioned, burſt, or made vnſeruiceable with too much Shooting, and therefore muſt be refounded into ſome better, and more ſeruiceable *formes*, or are ſuch perhaps, as are too great for ordinarie Carriages and bullets. If theſe old braſſe peeces be of too fine a *mettall* (wich yet is ſeldome found) the Mr. *Founder* maye mingle ſome ſlighter copper amongſt it; yea ſo much as he in his iudgment ſhall think fitting: ſo that the Ordnance, which he makes be anſwerable to their proofe.

Our newe Ordnance then being founded with theſe new *alligations*, and *alloyes* are commixted with $\frac{3}{4}$ parts of red Copper, made vp in Sowes $\frac{1}{4}$ part of Bell mettal caſt alſo in Sowes, and $\frac{1}{9}$ part of the fineſt Cornish tinne you can gett.

Theſe bricks are peeces of red copper weighing, about 50 lb. weight, caſt after the fashion of a square footed pauement, and your great Sowes, are peeces of other Copper, melted one time leſſe, then your brick Copper, where of ſome of them weighes 200, 300. yea the greatest 600 lb. a peece, The tinne is mixted amongſt the Copper, and Bell-mettal, that they maye runne the better in melting, which makes your peece more ſolid and firme.

But in Italy S.[not]. Alexander Bianco (*as mr.* Norton *one of his ma*[ties.] *maſter Gunners, and Enginier citeth in his practize of Artilerie*) *ſaith, That the beſt* Alligations *of theſe mettals for Ordnance is for every* 100. *lb. of Copper* 20 *lb. of tinne, and* 5 *lb. of braſſe, or Latton is to be mixted therewith. And* Digeo Vffano *a Spainyard, Captaine of the Ordnance in the Caſtle of* Antwerpe, *in his inſtruction of Artillerie affirmeth, that the beſt* ligature *for Ordnance is* 100 *lb. of Copper,* 8 *lb. of tinne and* 5 *lb. of Latton, and* 10 *lb. of Sow-lead, affirming that lead being tough & cold, maketh the peece become hard. But le* Sieur de Briſſac, *a french man in his* militarie diſcourſes *ſaith, that the French Founders vnto euery* 100 *lb. of Copper doe either ad* 20 *lb. of Bell-mettal, Which is* 25 *pound of Tinne & Lead for* 100 *lb. of Copper, or braſſe, or elſe* 10 *lb. of ſoft tinne to euery* 100 *lb. of Copper.*

The Lords the States haue in the Hagh a very braue founderie, and a Work-houſe ioyning to it, in Which they doe all their maſſive *Workes, and behinde that a ſpacious roome, Where they Sett and place all their carriages, Which is kept faire and dry, and beſides the* Maſter Founder *hath a houſe to dWell in, all Which belongs to the Land.*

The Maſter Founder *muſt be very carefull in makeing choiſe of his poWders, & Earths WhereWith he is to make his* Mouldes *for the Caſting of braſſe Ordnance in, that they be able to reſiſt the fire; and receiue the melted mettals: So that they maye render them to be caſt, and founded neately, Without being Subiect, either to be diminiſhed, crackt, or peeld, When they ſhalbe nealed, Which is ſuch a matter, as Without experience cannot be done Well. Wherefore, I Wil conclude With mr.* Norton *in his practize of* Artillerie, *that good Earths are neither fatt, nor leane, but betWeene both, and of a fine and ſubtill graine or mould, Which ſoone dryeth, and remayneth firme, Without breaking, being able to reſiſt the* vehemencie *of the fire, and ſuch Earths are moſt commonly of a yelloW, or a red colour.*

Now to finde ſuch Earths, as are fitt for your Worke, it behoueth you to ſinke *diverſe pits, or* Caues *vnder ground, Which haue not bin much ſtirred. And after you haue begun your Worke, and Compounded your* Earths *in a banke, or heape, and Wett, and moiſtned them like* paſte, *beginn then to beate them With a rod of yron, as the Potters vſe to doe their Claye. Then take* $\frac{3}{4}$ *parts of the Whole* lumpe, *and mixe it With* lint *of linnen cloath, and then beate the ſame together, vntill they be Well* incorporated, *that they maye appeare all one* ſubſtance, *and if any ſmall ſtones ſhould chance to fall amongſt it, then pick them out, or bruiſe them, as ſmall as maye be, that the poWders being Well tempred, maye ſerue for your moulds and formes.*

Of makeing of moulds for the founding of Ordnance.

THe Mr. Founder having prepared, and resolued of what kind, and what sort of that kinde the Ordnance is, which he intends to cast, he is then first to make a perfect modell there of, either of timber, or of Earth, or both, With all the Mouldures, Ornaments, & compartiments, euen as yon would have the peece to be, Which you must thinnely annoint With soft hogs-grease, and then cover it ouer with a Colume of the afore said tempered Earth, made and dryed by little and litle, augmenting it, vntill it be of a Competent strength, and thicknesse. This Colume must be made so, as it may be taken into two or more parts, to the end, to take the said modell, or patterne out of yt, and it is to be fortifyed on the outside, With plates of yron, as long as the chase of the peece is, and With yron wyres an inch each from an other, and lastly With y-ron hoopes a foote, or two assunder, to knock off, and on, as occasion shall require. Their must also be a smooth, and equall Cillender, Whose Dyamitre must be iust the heigth of the Bore, and made of the same Earth, moulded vpon a stronge Iron square Barre, and vpon a Cord moulded about the same, to make therewith the soule, Concaue or hollow Cillinder of the peece, by placing yt (by helpe of the Base, and muzzle ring) exactly in the midst of the vacuity of the outermost Colume, Which When the Patterne, or Modell Shalbe taken out, will remaine hollow, to receiue the mettal, that must make the bodie of the peece. All these must be Well ioynted together, polished smooth, dryed and nealed, that the mettall maye runne fine, and come off smooth and neate.

Lastly, the patterne of the breech, With all the mouldures, and Cascabell, is in like manner to be Couered ouer, ly litle and litle With the same tempered Earth, Which must afterwards be Luted neatly, and strongly to the breech end of the outter *Colume*: all which *mouldures, rings, armes, deuises, Flowers, Trunions, Dolphins*, and *Circles*, maye be at pleasure added there vnto, vpon the patterne, either with waxe, earth, or playster, and so the perfect *impression* thereof wilbe receiued by the *Concavity* of the out ward *Colume*, keeping still the due prescribed proportion of the peeces (yow intend to cast) accordmg to the kind & sort thereof, for the rest se mr. *Norton* in his 21, & 22 Chapters of the practize of *Artillerie*.

Having thus digressed, I will returne againe to my former matter, and giue the gentle Reader to vnderstand, that the States have Conditioned with their *Master Founder*, that he shalbe at the charge of makeing all *mouldures, formes*, castings, borings, and finding of firing, for which he hath from the *States* six gildens, or 12 shillings starling, for the founding, of 100 lb. weight; so that for a whole Canon, which weighs 7000 lb. weight, he hath 840 gilders for him and his men, the rest proportionally. Now when any old brasse peeces are to be cast, they are deliuered to him by weight, and he is allowed him ten pounds in euery 100 lb. weight for drosse and wast: for you must vnderstand, that Copper & brasse have much more drosse in them, then gould or silver, because the finer the *alloye* is, the lesser it will consume by fire.

The greatest number of new peeces cast in the States *Founderie* at the Hagh, euery yeare by the helpe of some, 20 men are six whole *Canons*, twelve *half Canons*, and *sixe long Feild* peeces, or *demy Culvering*, makeing in all the number of 24 peeces of Ordnance. But of late yeares they cast diverse sorts of french short Demy Canon, and smaller *Drakes*, as now the occasion of service requires.

These *Ordnance* being founded and made, the *master Founder* is to deliuer them to the States vpon Proofe in the presence of some *Commissioners*, and the *Controuleur* of the Ordnance, who are to ouersee them, and to take care, that the peece, which is to be tryed, be well loaded with her due weight of powder, and bullet, and rammed well home.

The proose of a whole *Canon* which weights 7000 lb. weight, and carries an yron bullet of 48 lb. weight, must be chatged with 32 lb. of fine powder, and with the bullet aboue said well rammed home; but the ordinary charge then of it wilbe noe more then 20, 19, or 18 lb. of fine pouder at the least: A halfe *Cannon* which weighs 4500 lb. weight and shootes a bullet of 24 lb. weight, the proofe Shott must be 16 pounds of fine powder & the ordinarie charge 12 lb.

A *Feild peece*, which weighs 3200 pound weight, carrying a bullet, of 12 lb. must be loaded with nine pounds of fine powder, but the ordinarie charge is noe more but sixe pounds.

The *Faulconet*, that weighs 2100 lb. which carries a bullet of sixe pound weight, must be loaded with 4½ lb. of fine powder for it proofs shott, and with 3 lb. for its ordinarie charge.

Note also, that a *Canon*, which shoots a bullet of 48 lb. must be bored for a bullet of 52 lb.

Weight, A Demy *Canon*, which carries a bullet of 24 lb. must be bored for a bullet of 28 pound.

Weight, A quarter *Canon*, which carries a bullet of 12 lb. must le bored for a bullet of 16 lb.

A *Faulconet* which carries a bullet of 6 lb. weight, must be bored for a bullet of 8 lb.

Your whole *Canon*, and *Demy Canon*, are commonly peeces for *Batterie*, vsed at seiges for to make a breach: but your *feild* peeces, and *Drakes* are to be drawne to some suddaine peece of seruice, as in the day of *battle*, vpon a *passage*, or vppon *plate formes*, & *batteries* made vpon the line of *Circumvalation*, or for the defence of a *Campe*, when an ennemy is at hand, and the rest of the short chambred *Drakes* likewise.

A *Canon* or a smaller peece of Ordnance, maye shoote in 12. howres some 80 shoot, yea 100, if it be not *ouer heated*, but after yow have made with it some 10 or 12 shott at the most, it must have a *cooling* time, by casting ouer the breech of it a *danck* hair cloath a pretie while, and that will coole it enough.

For a whole *Canon* mounted vpon a block waggon, or vpon its owne *carriage*, it is commonly drawne in these hollow, and marshie Countries, with a teeme of 15 couple of Lustie horses, besides the *Thiller* horse,

ſe, making account, that euery couple of horſes, muſt drawe for their shares 600, yea 650 pound weight if they be well putt to it. A *Demy Canon* with eleuen couple and a *Thiller* horſe, a quarter *Canon* with eight coupple and a *Thiller* horſe, & a Faulconet with foure couple & a *Thiller* horſe, and your ſmaller *Drakes* with a number proportionable to the weight abouesaid, yea euen to a ſmall Drake carrying a bullet but of one pound weight, is drawne but witha *Thiller* horſe. The length of the chaſe of euery peece both *reinforced* & *chambred* is noted aboue its figure.

The,

Demonſtration of the eight peeces of Ordnance, which are in moſt vſe, vnder the Lords the States ſervice.

And firſt of foure peeces of Ordnance reinforced Plate A.

Num. 1. is a Faulconet Weighing in mettall 2100 lb. Weight, being 10½ of a foot long, Which shooter an yron bullet of 6 lb. Weight, Which being layd leuell by the mettall, otherWiſe called the Horiozontall levell 800, *by the levell axis, or dispart, commonly called point blanck* 400, *& at the higheſt range* 4090 *paces at* 2½ *foote to the pace.*

Number 2 is a Feild peece, or a quarter Canon, Weighing 3200 *lb. being* 8 *foote and* ¾ *of a foote long, Wch shootes an iron bullet of* 12 *lb. Weight, & carries by the mettall* 600, *by the Axis or point blanck* 300, *and at the higheſt range* 3800 *paces.*

Number 3. *is a Demy Canon, Weighing* 4500 *pound Weight being* 10 ½ *foote longe, carrying an yron bullet of* 24 *lb. Weight, Which Will shoote levell by the mettall, or* Horiozontall *levell* 800, *by the Axis or point blanck* 400, *and at the higheſt range* 6000 *paces.*

Number 4. *is a Whole Canon, Weighing in mettall* 7000 *lb. Weight, carrying a bullet of* 48 *lb. Weight, Which shoots by the mettall, or Horiozontall levell* 1000, *by the* Axis, *or* point blanck 500; *and at the higheſt range* 7000 *paces at two foote and a halfe to the pace.*

I referre the Reader to the other ranges ſpecifyed in the quardrant *and table following.*

Of the other foure peeces of Ordnance, called Drakes chambred Plate B.

Number 5. *is a ſmall Drake, Weighing* 280 *lb. Weight in mettall, and is* 4 *foote long, carrying a bullet of* 3 *lb. weight, charged With one lb. of powder, Which Will shoote levell by the mettall* 176, *by the Axis, or point blanck* 40 *and at the higheſt range* 800 *paces.*

Number 6. *is a Drake Weighing* 580 *pounds, is* 5 *foot long carring a bullett of* 6 *lb. Weight loaded With* 2 *lb. of powder, Which Will shoote levell by the mettall* 196, *by the Axis or point blanck,* 100, *and at the higheſt range* 2500 *paces.*

Number 7. *is a quarter Canon Drake Weighing* 1130 *lb. Weight in mettall, is* 6 *foote long carrying a bullet of* 12 *lb. Weight, charged With* 4 *lb. of powder, Which Will shoote levell by the mettall* 264, *by the* Axis, *or point blanck* 140 *and at the higheſt range* 2500 *paces.*

Number 8. *is a short Demy Canon Drake, Weighing* 2250 *lb. Weight in mettall is* 7 *foote longe, carrying a bullet of* 24 *lb. weight, With* 6 *lb. of powder Which, Will shoote by the mettall, or Horiozontall levell* 340, *by the Axis, dispart, or point blanck* 180 *and at the beſt, or higheſt elevation* 2770 *paces.* *Note by the Waye, that the longer the chaſe of a peece is, being* reinforced *& Well charged, the further it Will carrie its bullet, and the ſtroak the more violent, as you maye ſee by long* Culverings, *and* ſlinghs *of ſome* 24 *or* 25 *foote long in chaſe, Whereof the experience hath bin tryed at* Arnham *in* Gelderland, *Where a long* Sling *lay vpon a Bulwarke, Which shott from* Arnham *to* Nemegen *being* 6 *english miles diſtant one from an other. Againe, the Shorter the chaſe of a peeces is, as in theſe* Drakes, *the ſhorter it carries the bullet, as you maye ſee by their ſeuerall ranges.*

Yet this doth not alWaies hold true, for Count Maurice Prince of Orange *of bleſſed memorie, tryed once a halfe Canon vpon the Strand at* Scheveling, *giving it the due charge of powder, and cauſed the Canonier to levell yt vpon its higheſt range, at* 6000 *paces, to trye this concluſion, to ſee how farre it Would carry, When it Was shorter, cauſſed ſome two foote and a half of yt to be ſawne off, made it be loaded againe, shoot it off, and found that it carried its bullet as farre as it had done before.*

To concludc, with Touch-holes, I have ſeene in Oſtend vpon the Weſt Bulwark, that ſome touch holes of Canon, were blowne ſo great with often and continuall shooting, that I have putt my fiſt into them. Now ſuch a touch hole being blowne ſome three or foure inches, maye eaſely be remedied. For if yow bore the hole round, and driue in a ſcrew of yron into it, as thick as your finger, and in the midſt of the ſcrew aboue ſaid, bore a ſmall Touch hole in yt, yow ſhall finde this to laſt longer yn blowne, then any other way, which hath bin invented, for now when ordnance are caſt a new at this day, for the preventing of this two much blowing, they vſe now to make ſuch a touch hole with a ſcrew, as is here mentioned which will not ſo ſoone be blowne great, and as your braſſe or Copper Touch holes will.

The ſecond Chapter.

Treating of a ladle, a Rammer, of a Sponge, and a Feild Carriage for a peece of Ordnance as ſhall be demonſtrated vnder the Carriage.

THe figures of a ladle, a Rammer, and a Sponge is repreſented vnto yow vnder the Faulconet, and feild peece, with their iuſt length, and thickneſſe, after which forme yow maye make all others for what ſorts of peeces yow pleaſe, and with all obſerue, that the bigneſſe of them muſt be according to the Dyamitre of the bullet which your peece carries. The length of the ladle vnder the feild peece with the ſtaff and Rammer is 11 foote, and 9 inches & a halfe long. The openning of the ladle is a foote and ½ part of an inch. The braſſe plate rounded to the ſtaff, and to the height of the ſhoot, and due vent allowed is fiue inches. The ſtaff of the ladle 3 ynches thick made of ſoft faſt wood as Aspe Beech or willow. The Rammer B is 4 inches, turned with hard wood, and the length of the copper ladle a foote and ten ynches, the ſtaff to the neck on both ſides is 3 inches thick. The Dyamiter of the bullet is traced out with pricks coming downe from the ladle marked 12 & 3.

The Spunge C. is couered with rough sheeps skinns wool, and nailed to the ſtaff with Copper nailes, ſo that it maye fill vp the Soule or Concavity of the peece whē it is to be ſcowred and cleared. Note alſo that the Copper ladle for a peece of ordnance muſt be threetimes the length of the Dyamitre of the bullet. Such a ladle coſts the States 6 gl. 10 ſtivers, vidz. The ſtaff 2 gl. and 14 ſtivers for a whole Canon, for a halfe Canon 5 gilders, for a feild peece foure gilders 10 ſtivers. And the Rammer, the ſtaff, and the Sponge or sheeps skinne will coſt two gilders 14 ſtivers.

Yow have alſo in the plate B. figure 9 repreſented vnto yow the figure of a Carriage for a feild peece with all the Dimenſions, ioynts, and parts belonging to yt.

The Naues, The cheeke, called limbres, and the wheeles are made of Elme, but the Tranſoms, The Axeltrees, the ſpoakes of Oaken timber, and the fore carriage of the wheeles are made of the ſame wood, as the former are, but the Tranſoms are elme and the croſſe beames of Oake as the ichnographie of the Carriage Figure 9 showes.

The Lords the States have agreed with there Maſter Carpenter, to make them a Carriage for a whole Canon for 134 gilders 10 ſtivers, namely the two ſide peeces 15, or 16 foote long, 17 inches broad, and 6 ½ inches thick, for 59 gilders, and to every carriage foure Tranſoms for 6 gilders. An Axeltree for 4 gilders 10 ſtivers, The two wheeles 37 gilders 16 ſtivers, for the framing and makeing of the carriage for a whole Canon 27 gilders 10 ſtivers, for an Axeltree 1 gl. 10 ſtivers, for the makeing, of the wheeles 10 gl. which comes to in all, as aboue ſaid to 134 gilders 10 ſtivers, and ſo the reſt of all Carriages proportionally.

The

Demonſtration, or Terciating of the whole Canon, Num. 4. and alſo of the Demy-Canon Drake chambred, Num. 8. with their ſeuerall names and parts diſcribed.

NOte firſt that a peece of Ordnance is diuided into three parts. 1. *The* Breech, *or* chamber 2, the trunions, & 3 the Muzzle, *or neck, and the length of the whole peece is called the* Chaſe, *or* Colume.

A. is the Cornish, *brow, or* baſe ring *of the peece.*

B. is the peeces neck. C. the peeces Boutill, *or* Aſtragall *called the muſſel* Ringe.

D. The Reinforced ring. *E. The* tronion-ring, *& theſe* 2 *tronions are two* ſpyndles, *vpon which the peece lieth in its carriage. E H. is that part of the peece, betweene the Breech, the tronions, & the eares.*

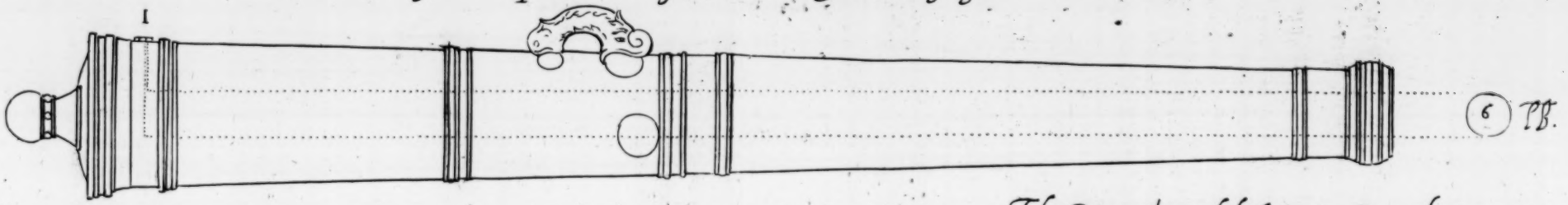
F I. is the Calibre, *Mould, or the bore of the peece. G. is the* touch-hole, *and all the metall behinde the* touch-hole, *is called the* Breech. *F H. is the* Coile *of the peece. H. The* Caſacabel, *or the out moſt* pommel *or button of the peece. F L. is the* mettaline *Subſtance, & thickneſſe of the* Coile, *about the breech of the peece aboue the* concave Cillender, *otherwiſe, called the* Sowle *of the peece.*

M. is the mettaline Subſtance *at her eares, and Stayes of* Gravitie, *by which shee is hoiſed vp into her Carriage. So much of her bore, as containeth the powder, and shoot. is called the* chamber, *or charge* cillender, *the reſt the vacant* cillender, *& all the rings circles, and eminences at her mouth & breech are called the* Friezes. *To conclude, the ordinarie Canons of Batterie is ⅛ of ſubſtance in their chambers ⅓ at their Trunions, & ⅔ at the muzzle, or necks of the* Dyamitre *of their* Calibres, *or boores in thickneſſe of mettall. And thus much briefly for the demonſtrating of anyother peece of Ordnance what ſoeuer.*

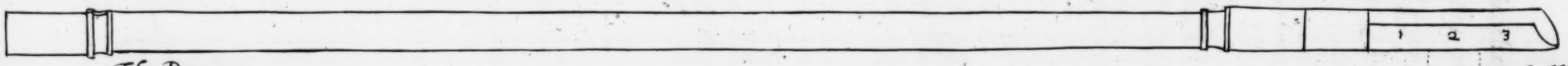
practi-

The figures of foure seuerall peeces of Ordnance, reinforced, cast for the States of the vnited Prouinces.

A Falconet of 2100 pound weight the length 10 3/4 of a foote.



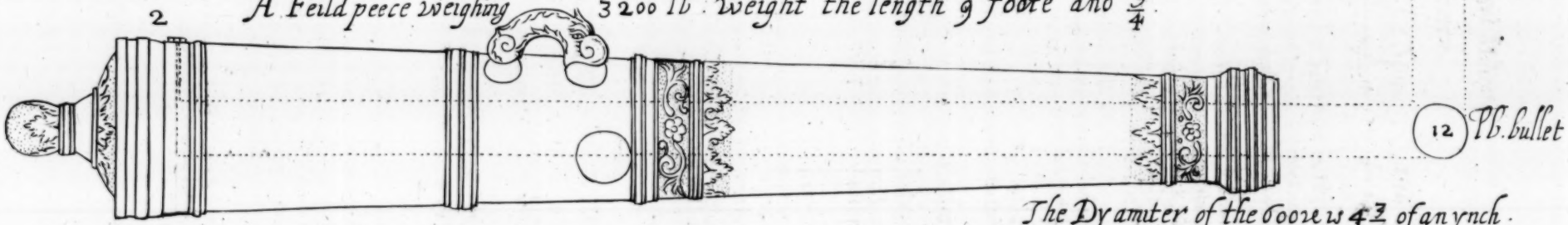
The Dyamiter of the boore is 3 3/4 ynches



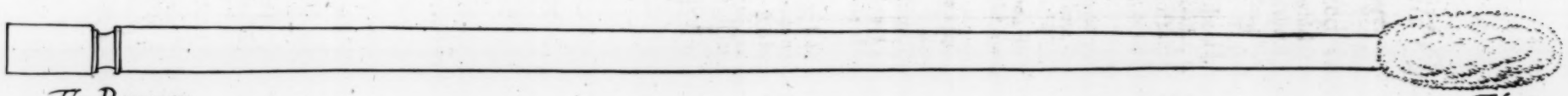
The Rammer

The Sadle

A Feild peece weighing 3200 Pf. weight the length 9 foote and 3/4



The Dyamiter of the boore is 4 3/4 of an ynch.

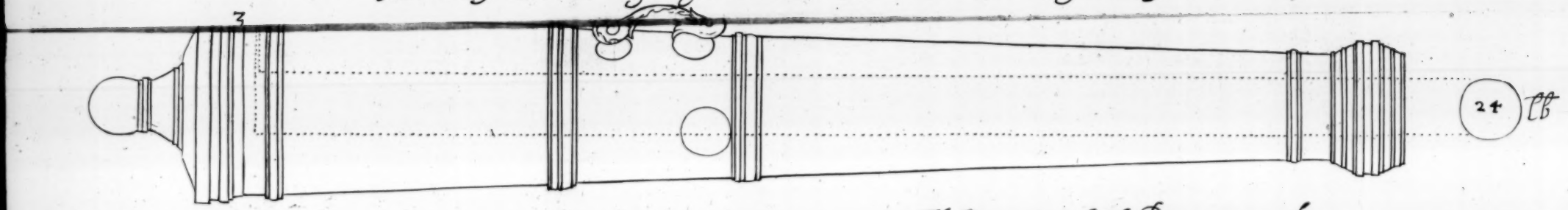


The Rammer

The scourer or Sponge.

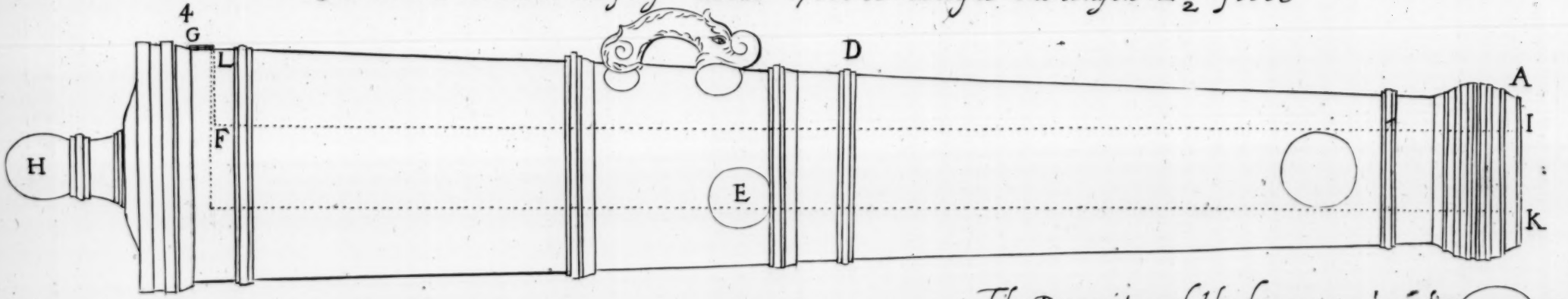
A Demy Canon weighing about 4500 Pf the Length 11 foote and 1/4.

A Demy Canon weighing about 4500 lb the Length 11 foote and $\frac{1}{4}$.



The Dyamiter of the Boores. 6 ynches

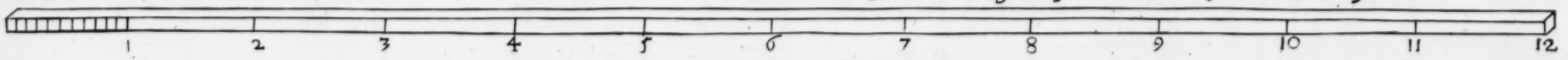
A whole Canon weighing about 7000 lb. weight the length 12 $\frac{1}{2}$ foote



The Dyamiter of the booze is 7 $\frac{1}{2}$ ynches

A

The Scale of an English foote at 12 ynches to the foote



Fowre peeces of Ordinance chambred.

A Drake weighing 280 lb weight, the length 4 foote.

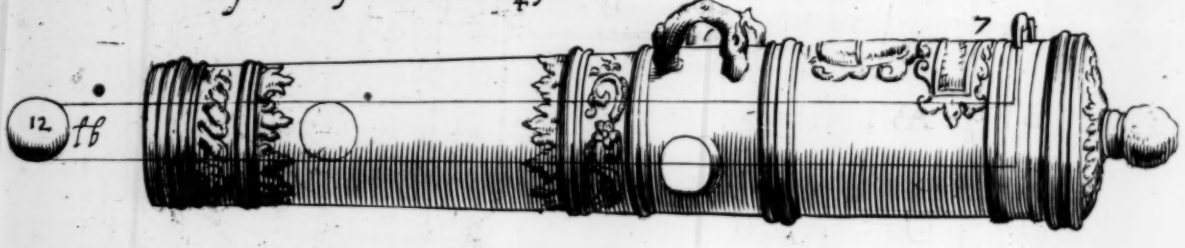
The Dyamiter of the bore is 3 ynches.

A Drake of 580 pounde weight The length 5 foote

The dyamiter of the bore is 3 3/4 ynches.

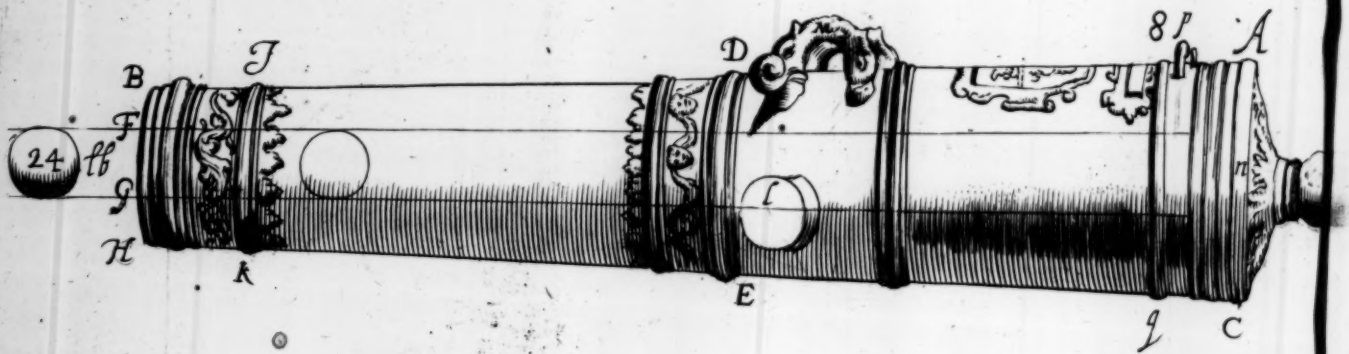
A quarter Canon Drake of 1130 lb weight The length 6 foote

The Dyamiter of the bore is 5 3/4 ynches

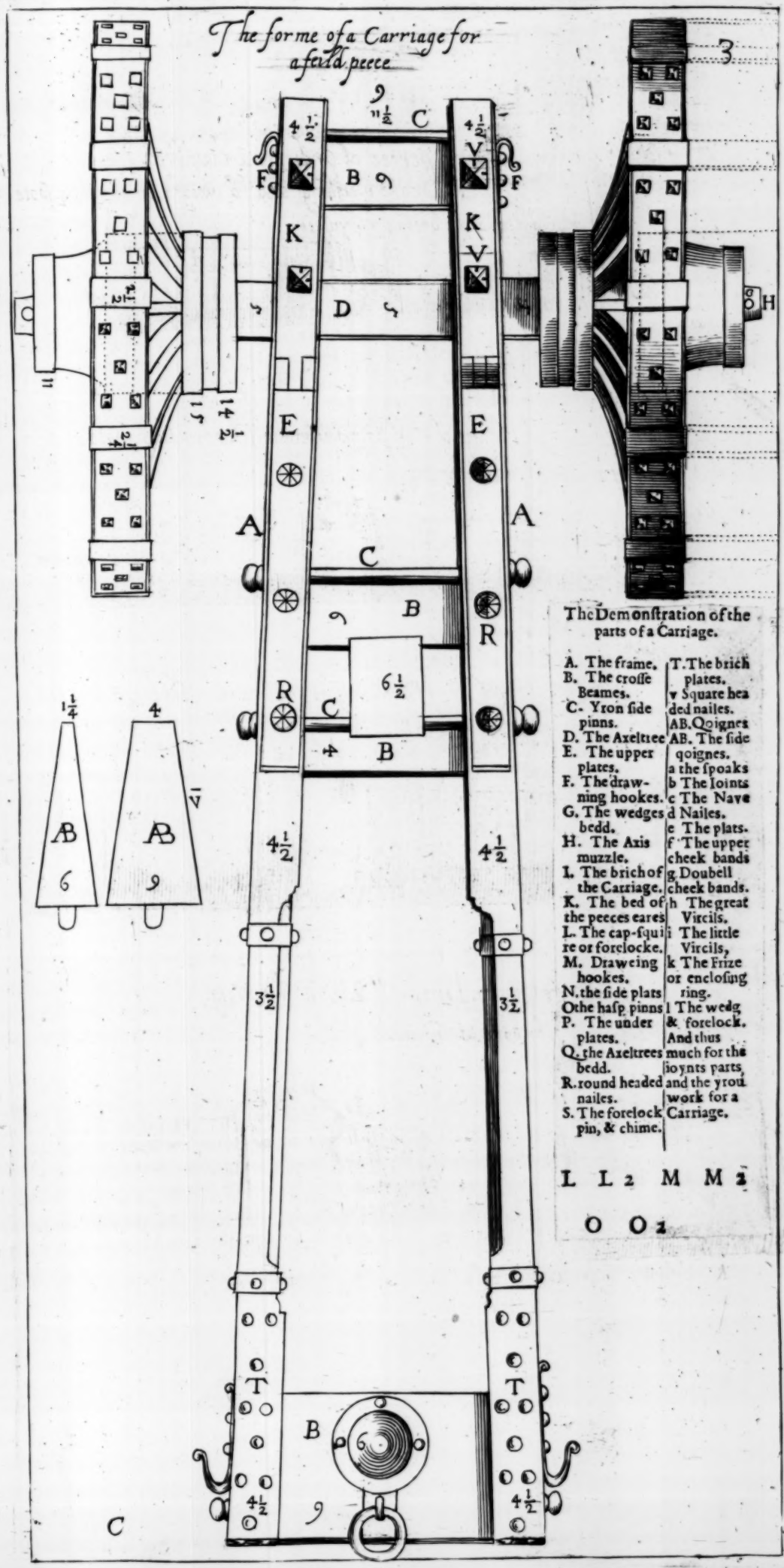


A halfe Canon Drake of 2250 lb weight the length 7 foote

The Dyamiter of the bore is 6 ynches.



The forme of a Carriage for a feild peece



The Demonstration of the parts of a Carriage.

A. The frame.
B. The crosse Beames.
C. Yron side pinns.
D. The Axeltree
E. The upper plates.
F. The drawning hookes.
G. The wedges bedd.
H. The Axis muzzle.
I. The brich of the Carriage.
K. The bed of the peeces eares
L. The cap-squire or forelocke.
M. Draweing hookes.
N. the side plats
O the hasp pinns
P. The under plates.
Q. the Axeltrees bedd.
R. round headed nailes.
S. The forelock pin, & chime.
T. The brich plates.
V Square headed nailes.
AB. Qoignes
AB. The side qoignes.
a the spoaks
b The ioints
c The Nave
d Nailes.
e The plats.
f The upper cheek bands
g Doubell cheek bands.
h The great Vircils.
i The little Vircils,
k The Frize or enclosing ring.
l The wedg & forelock.

And thus much for the ioynts parts and the yron work for a Carriage.

THE DEMONSTRATION OF THE NEXT FIGVRES following; and firſt of a Block, or a long Waggon.

THE THIRD CHAPTER.

THe firſt figure underneath number 10. sheweth you of what ſingular uſe and accommodation your *Block*, or *Long waggon* are, for the carriage, and drawing of a peece of Ordnance, or for the carrying of ſmall Punts, or Boats to clapp a bridge on a ſudden over a River, or a brooke, when occaſion may ſerue: therefore there is no one Inſtrument more uſefull for the traine of Ordnance then this is, and are excellent good alſo, to ſtop an *Avenue*, or a paſſage croſſwiſe, where an Enimies horſe may breake in vpon an Armie unawares: eſpecially, when one hath no time to caſt vp a trench, or a traverſe vpon it. Beſides, a peece of Canon will be eaſilyer drawne, through moorish, foule, and ſandie wayes vpon this, becauſe the peece lieth more ſteddie, and is not ſubject to ſo much wrenching aſide in durtie and Ruttie waies, then vpon its proper Carriage. Now whenſoever an Enemie should draw neere unto an Armie by the helpe of the *Fearne*, you may quickly hoize it vp, and laye it vpon its one carriage. The forme and modell whereof is repreſented unto you in the figure following, noted number 10.

The ſecond figure number 11. demonſtrates to your eye a halfe Canon mounted vpon its carriage, drawne with ſeven coupple of horſe, and a *Thiller* horſe, and this to be underſtood in a good way: but if the way be foule, morish, and durty, then for a whole Cannon, weighing 7000 lb. weight, you muſt ſpanne in 15 couple of horſe and a *Thiller*; for a *halfe cannon* eleuen couple and a *thiller*; for a feild peece, or a quarter Canon, ſix couple and a *Thiller*; for a *Falconet* two couple and a *thiller*; and for a ſmall *Drake* weighing 250 pound weight one horſe. You muſt obſerue alſo that the mettle of one of the States half canons weigheth (as is ſaid before) 4500 pound weight, the carriage and yron worke thereunto belonging about 900 pound, ſo that theſe horſes are to drawe in all the weight of 5400 pound, and the other peeces proportionably.

The third figure, number 12. repreſents unto you this, that when you want or cannot uſe Canon horſes and *Athrals*, how you may then by the helpe and ſtrength of men, drawe a peece of *Ordnance* to the topp of a hill, and there to make a *Platforme* for the battering of a Caſtle: Now preſuppoſe you are to batter it with 16 Peeces of Ordnance; to wit, eight *Demy canon*, and 8 *Quarter canon*, the firſt carrying a bullet of 24 li. and the ſecond of 12 li. and are to carry along with you all neceſſaries, as Powder, Bullets, Match, bedding, traces, and diverſe other materials. The queſtion is how many Souldiers, Pyonners, and workemen are able to doe this? which *Diego Vffano* in his 22 Dialogue reſolveth in this manner following.

Of a Block waggon, and drawing of Ordnance.

Firſt for 600 halfe Canon Bullets, each bullet weighing 24 pound, the whole weight of them will come to 144000 pound. Now if yee lay three of theſe bullets, in a wheele-barrow, they will make 72 pound for every Souldier to wheele, and will require 200 men to doe it.

And for 600 quarter canon bullets, weighing 12 pound a peece, the weight of the whole will be 7200 l. now putting 7 of theſe into a wheele-barrow, for every mans share to driue, you muſt haue 86 men in all, and every man as before 72 pound weight.

Item for 168 hundred weight of powder, for to charge theſe 16 peeces of Ordnance withall, each halfe canon requiring 12 pound of good powder for its charge, and for your quarter canon, or field peece 7 pound; you muſt have 240 ſmall firkins, or ſo many leather powder baggs to carry it in, and giving to every Souldier 70 pound weight of powder, it will require the like number of 240 men to carry it, as is reperſented vnto you in the fourth plate and 12 figure following.

Now for the *Attelage* or drawing ropes for theſe 16 peeces of Ordnance, repreſented vnto you

alſo in this fourth plate, and 13 figure, is showne you the manner of it, by dividing your men into three drawing files, or teames, accordiug to the greatneſſe of the peece, which your men are to draw vp, for a *Demy canon*, carriage, attelage and all will weigh a matter of 6000 pound weight: now giving to every man 60 pound weight to drawe, ſuch a halfe canon will require 100 men to drawe it, and proportionably the 8 halfe canons 800 men.

For a quarter canon, carriage, attellage and all, will weigh 3000 pound weight, now allowing to every man 60 pownd weight to drawe, every of theſe 8 peeces will require 43 men: ſo that for theſe 8 quarter canons you muſt have in all 344 men, which being (as is ſayd) divided into three equall files and diſtances, each drawing rope muſt have 14 men and one odd man over, to goe by.

And becauſe it may ſome times happen, that by reaſon of the ſteepineſſe, badneſſe, and unevenneſſe of the way, you may be driven to diſmount, and remount your peece, ere you get up to the topp of the hill, you muſt carrie along with you a *Fearne*, a *Winch*, or a *Scalet*, with all appurtenances thereunto belonging, as *Winding ropes*, an yron *Goates-foote*, with a crowe, pinns, truckles, pullies to helpe you withall at a dead lift. All theſe *Engines* and *Materials* may conveniently be carryed on the ſhoulders of 30 men, in ſo much that if you make your calculation, you ſhall finde that you muſt haue for the drawing of theſe 16 peeces of Ordnance, and for all things aboue ſpecified, the number of 1703 men, without any difficultie will doe the deede, and drawe theſe Ordinance whitherſoever you pleaſe. The *Fearne*, the *Figure*, and its neceſſaries, ſhall be deſcribed unto you in the next chapter following.

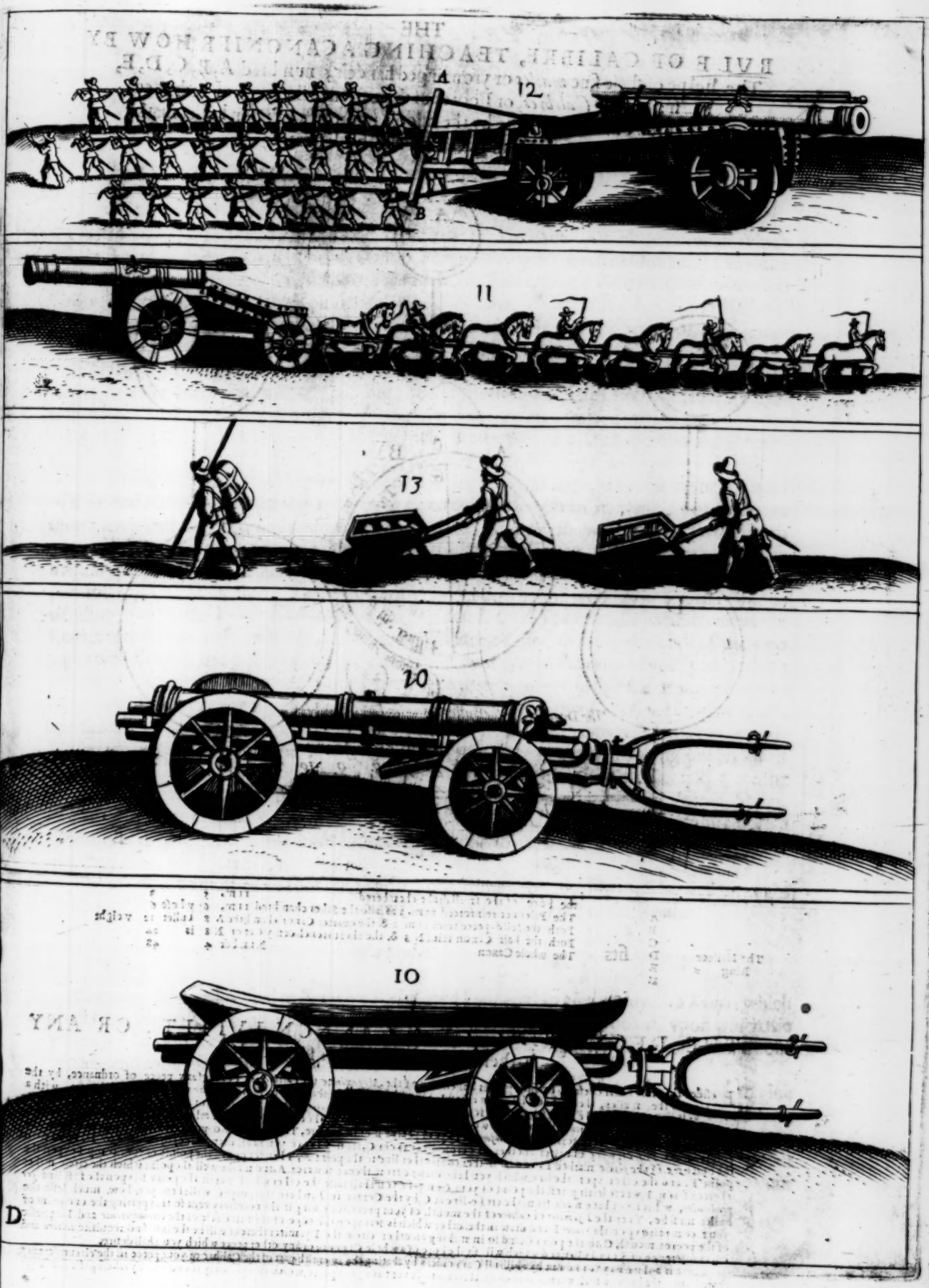
Now for your *Attirals* or drawing harneſſe, to the end that every man may drawe alike share, you muſt faſten a *Croſſe beame*, or barre, to the end of your *Fore waggon*, marked as you ſee with *A B.* through which you putt your *drawing ropes* into an equall diſtance, that your men may not hinder one another, drawing: having behinde it three men to ſteere the peece aright, when you come to any winding, or turning by the way.

Againe, if it be a *whole Canon*, or a great peece of Ordnance, which you are to drawe through a trench to a batterie, or ſome other place, where you would plant it, and finde theſe drawing ropes to short for the men that are to draw it, then you muſt lengthen the ropes, and faſten an other croſſe barre juſt in the very middeſt, and this will guide your peece from wrenching aſide; for certaine, the shorter your drawing-ropes be, the more ſteddie, and eaſier your peece will be drawne. To every drawing rope alſo you muſt haue as many *Neck lines* to caſt about your mens ſhoulders as you haue men, to the end they may draw with the more eaſe, ſtrength, and take firmer footing. Nevertheleſſe if you drawe your peece after this manner up to ſome ſteepie hill, leaſt the peece ſhould fall downeward and overturne them, for the avoyding of this danger, they muſt in an inſtant whipe theſe lines over their heads to looſen themſelves from them, or elſe cut them on a ſuddaine; but then it is ſafer to drawe with their hands.

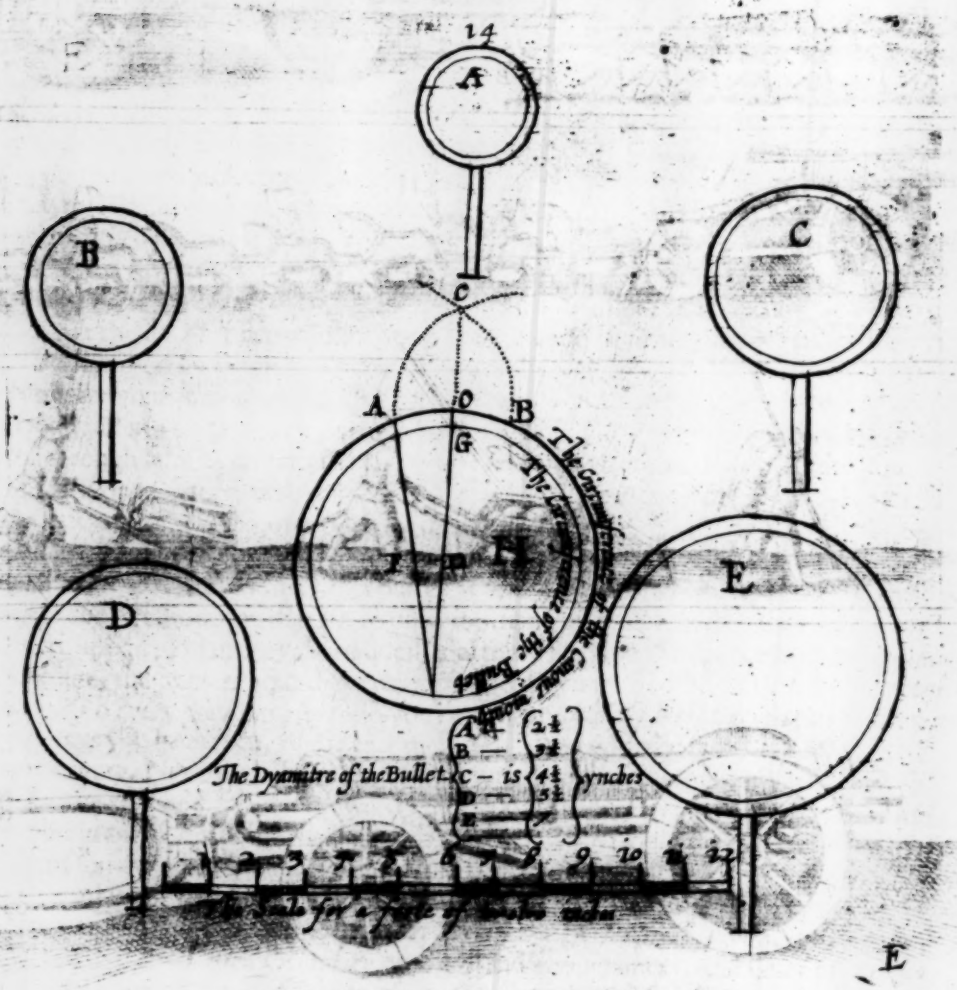
This manner of drawing of Ordnance is no new thing, but hath bin practiſed by the firſt *Conquerours* of the *Weſt Indies*: as *Pizarre*, *Fardinand Cortes*, and diverſe others, who with the ſtrength of men drew their Ordnance over hils and mountaines to the Citty of *Mexico*. Likewiſe, *Henry the fourth* King of France, of immortall memory, uſed this manner of drawing of his Ordnance over the *Alpes* in his laſt warres of *Burgundie*, and inſtead of *Tyoniers* uſed Luſty Swiſſers to do it.

The fiue rings: (called *Mailles* in Dutch) number 14. is to trye whether the bullets which you are to chooſe in the *Arſenall* will fall through them, which if they do, then they will fitt your peece to a haire, the ſeuerall *Calibres* and bores of your eight peeces of Ordnance deſcribed before.

Practi-


A
12
B
11
13
10
10
D

THE RULE OF CALIBRE, TEACHING A CANONIER HOW BY The helpe of these fiue *mailes* or yron ringed handels, numbred A, B, C, D, E, he may fit the *Calibres*, or Boores of these 8 seuerall peeces of ordnance, figured out aboue, as also by the middle figure of a Cannon bullet marked H, and deifered also by letters.



			the bore of the small drake chambered	num.	5		3
	A		The Falconet reinforced num. 1 as also the Saker chambred	num,	6	whose	6
	B		Both the feild-peece reinf num 2 & the quarter Canon chambred	N	8	bullet	12 weight
	C		Both the half Canon reinf N 3 & the short french demy Canon	N	8	is	24
The Maileor Ring	D	fits	The whole Canon	Number	4		48
	E						
	H						

is

THE DECYFERING OF A CANNON BVLLET, OR ANY other peece by letters as followeth.

Besides this manner aboue said, by fitting your bullets out of the *Magazin*, to the *Calibres* and bores of any peece of ordnance, by the helpe of the mailes, the Cannon bullet marked H, shewes you also another way to fit the *Calibre* of a peece of ordnance, with a right bullet, by putting it the requisite vent As for example, take the iust *Diamiter* of the mouth of your peece, with a paire of straight *Compasses*, and deuide the *couerture* thereof into two equall parts, and draw from the *Center* the circle marked B A and E, whose *Center* also is noted to be *D*, which is the forme & *Circumference* of your peeces mouth or bore, Then set the two points of your compasse vpon the points A and B, in drawing one after another, the crose-lines vnder C, from whence you shall draw a line *perpendicular* to D, downe to the bottome of the circle marked E, and from thence an other line to the point A, Then set one of the points of your compasse vpon the point E, and the other vpon the line which you haue drawne from thence towards A, and marke well the point which the circle makes thereof from F, where letting rest the point of your Compasse you shall raise the other which was in the point E, vpon the first line *perpendicular*, which you haue made from the crosse-line at C, by the Center to *D*, where the point C will shew you how much lesse the bullet must be, Then the *Dyamiter* or *Calibre* of the mouth of your peece, for giuing it the necessary vent so that putting the one point of your compasse vpon the *center* D and draw in the other which is sett vpon the edge of the first circle of the *circumference* and Largnesse of the peeces mouth O, to the point G, and so in making an other circle the Dyamiter thereof will be the iust and requisite *calibre* and Circumference of your bullet, and which will fit the bore of a whole Cannon, or any other peece which you shall desire.

There is a third way found out by skillfull Canoniers by abating the twentith part of the Calibre of your peece in the circumference thereof, to the bullet which with a sufficient abatement & vent for your peece, which rule is easely found out by takeing the iust Dyamiter of the mouth of your peece.

Practi-

OF A FEARNE, A SCALET, AND A WINCH.

The Deſcription of a *Fearne*, called in French a *Guindall*, in Netherduch a *Bock*, from a Goate; with a *Scallet*, and a *Winch*, being of excellent uſe about the traine of Ordnance. Repreſented vnto you in the fifth plate, and 14. 15. and 16 figures following.

THE FOVRTH CHAPTER.

THe Carriage being placed in a readineſſe, you are then to hoiſe vp your peece into it, which in regard of the weight of it, be it a Canon, or any other great peece of Ordnance, cannot be well done without the ingenious helpe of the *Fearne*, or *Ghynne*, ropes, a Goats foote, or an yron Crow, leavers to winde vp the Rouler &c. eſpecially when a wheele is graveled and ſticks faſt in ſome deepe rutt, or rotten ground, then you muſt uſe the helpe of the Scalet or *Winch*; demonſtrated unto you in the figures following.

Firſt then you muſt make and frame your Fearne, according to this modell uſed in the States ſervice, which is accounted the beſt, number 14: and for the goodneſſe of it ought to be preferred before all others, and for the lightneſſe of it may vpon a march be layd vpon a waggon to be carryed along in the traine of the Ordnance with the Scalet, Winch, and all appurtenances thereunto belonging. It is made vpon three Feete, Beames, or Supporters, *triangular* wiſe, vpon which it ſtands. The demonſtration is this, *a.a.a.* are the three feete, which at the top or head of it are induſtriouſly joyned together; from *b.* to *c.* is the length of it, ſome 13 or 14 foote long: it is framed a foot broad, and halfe a foote thick; *d.* and *e.* showes a great yron bolt with a round head, and at the other end a croſſe wedge to clench and joyne it cloſſe together. *f. g.* is the Copper hoocke and ringe, vpon which the vppermoſt pullie or Truckle hangeth; *h.* the vppermoſt truckle it ſelfe, through which the ropes are let downe and wound vp: *i. i.* the cable or winding rope: *k.* the lower *truckle* above the Rouler: *l. l.* the Plate worke, within which the Rovler turnes in its bed, and ſcockets. *m.* is the Rouler it ſelfe. *n. n.* are the ends of the two ropes well pleated, and bound about, which are to be put through the eares of your peece which is to be hoiſed vp: *o. o.* the two oblique yron plated feete, vpon which it ſtands and reſts vpon the ground, and by reaſon they are ſo made, cannot ſo eaſily ſlip away, or ſinke into the Earth, but makes the Fearne to ſtand ſteadfaſt, and firme. *p.p.* are the holes into which the two woodden leavers are put into the Rouler and wound vp by two men, the one taking out his leaver to put it into an other hole, while the other with all his ſtrength holds the rouler faſt: *q.* are the two winding leavers. *r.* the Goats foote, or yron Crowe, neceſſary both for the Fearne, Scalet, and Winch. One of the winding ropes muſt be at leaſt 25 foote long, and in circumference a Geometricall ynch and $\frac{1}{2}$; the ends whereof muſt be ſo wreathed and bound faſt together that they muſt not looſen.

The maine rope muſt be 75 foot long, and 1 $\frac{1}{4}$ of a foote about; the ſlip muſt be well wrought and bound about with packthred, which is put through the two holes of the Rouler.

Of a Scalet.

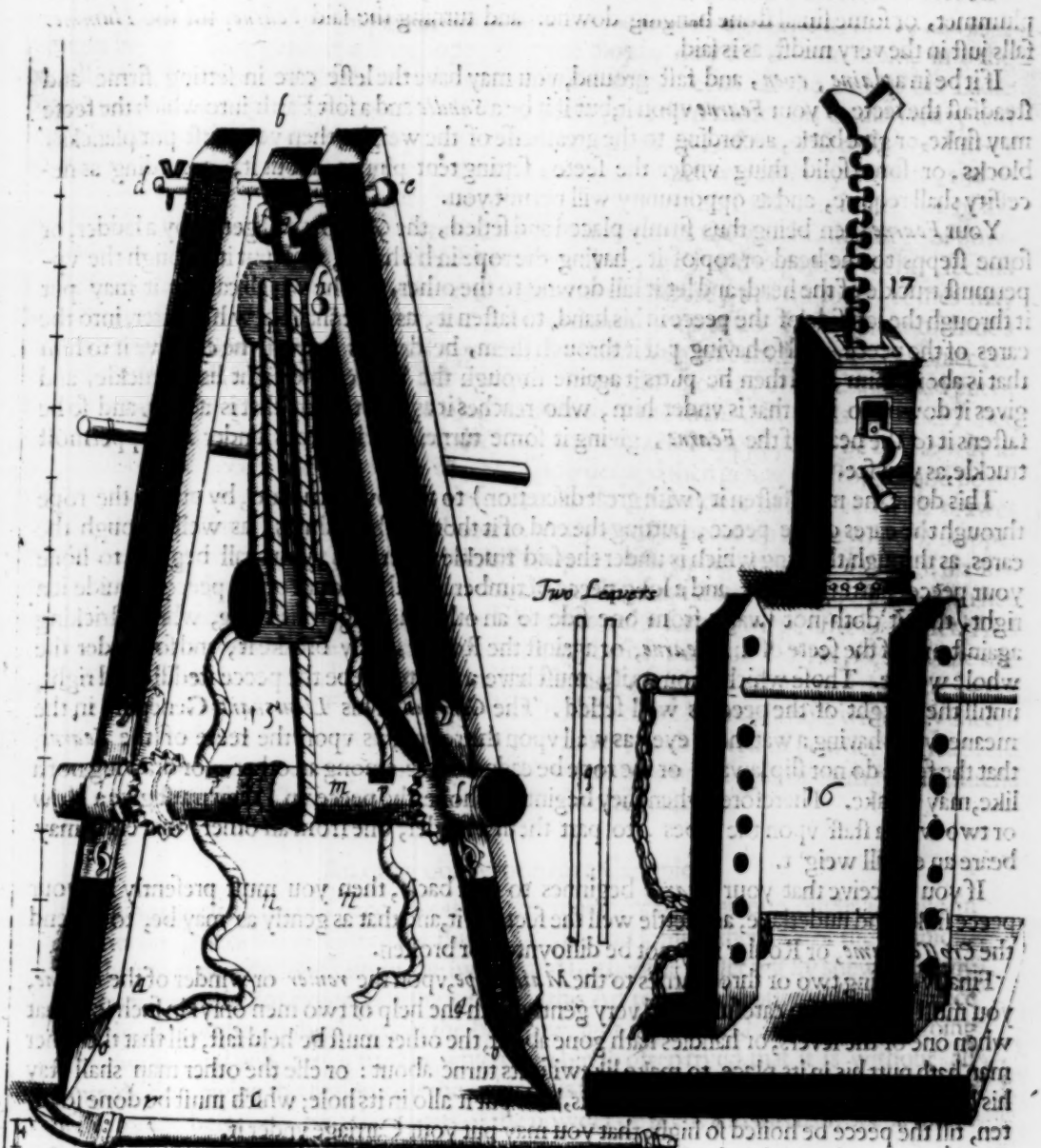
The other Engine is called in French a *Scalet*, or a Ladderet, in Netherduytch a *Knape*; which muſt have likewiſe a ſtrong yron Crow belonging to it, a thick oaken board, vpon which the pillers, or ſupporters of the weight ſtands, which are well nigh two foot long and a foot broad, and about halfe a foot in thickneſſe.

The two pillars of the Scalet muſt be enchaſed a quarter of a foot in the thick board, to giue it the more firmeneſſe, where vpon they ſtand, and muſt be a matter of two Geometricall foot high about the ſaid board, and $\frac{1}{2}$ and $\frac{1}{4}$ part of a foot thick, each pillar (as you ſee) having eight holes boored through them at an equall diſtance one from an other, thorow which you are to put

your great yron bolt, which with the yron crowe, muſt ſuſtaine and beare up the ponderoſity: unto this bolt there is an yron chaine faſtned to it, and nailed to the right hand pillar as you may marke: the bolt it ſelf ought to be 1 ½ of a Geometricall inch round, and 1 ½ of a foote long, each pillar muſt ſtand at leaſt halfe a foote one from an other. Vpon this yron bolt, which may be put into any of the holes as you raiſe vp the peece, and as occaſion ſerues, reſteth your yron crow and leavers, and receiveth ſtrength from it to lift vp your wheele peece, and all at a dead lift out of any rutt, moorish ground, or place when it ſticks faſt in it; and as you raiſe it, by this engine, you may clap thick fagots, or boards vnder the wheele, till you advance it higher to an other hole.

The *Winch* or *Windlace* repreſented here unto you in the 14 figure, is called in Netherduch a *Windaes*, or a *Dumcracht*; and is a differing Engine from the former, but of ſingular uſe alſo for the heaving vp of a peece of Ordnance, carriage, and all, let it be never ſo great, or any ponderous weight, as blocks, loggs &c. yea it is of ſuch great ſtrength and force that it is able to overturne a houſe, and hath no neede but of one man to put it a worke. Now to make it ſtronge and ſufficient, it muſt be two foote long at the leaſt, 1 ½ foote broade, and ½ foote, thicke, with a vice, and a teethed ſcrue comming out of the midſt of the woodworke of it, and winding up its teeth by the force of two ſecret wheeles turning within the midſt of the woodworke. This Engine may alſo be uſed (as the former) for the lifting up of a peece of ordnance out of a deepe rutt, morish ground, or any durt or mire into which it is ſunck; by laying of thick boards, and fagots vnder the wheele, as is ſaid; and this will be done quickly, ſo that you neede not looſe much time vpon a march: and thus much in briefe for the makeing and uſe of theſe three Inſtruments. The figures whereof follow in the next page.

Practi-


b
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17
Two Levers
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F

HOW ONE IS TO MOVNT A PEECE VPON ITS CARRIAGE, by the helpe of a Feurne, or a Ghynne.

THE FIFTH CHAPTER.

BEfore you are to mount your peece, above all things you muſt have a ſingular Care that the *Fearne* be ſo firmely ſet, that it doth not recoile or ſlip away in any manner, and ſo that the rope, and pullie, or truckle, comming downe from the head, fall juſt vpon the eares of the peece; whereof to be aſſured, you may let fall downeward from the pullie aboue, a whipcoard with a plummet, or ſome ſmall ſtone hanging downe: and turning the ſaid *Fearne*, till the *Plummet* falls juſt in the very midſt, as is ſaid.

If it be in a *plaine*, *even*, and faſt ground, you may have the leſſe care in ſetting firme and ſteadfaſt the feete of your *Fearne* vpon it; but if it be a *Sandie* and a ſoft Earth into which the feete may ſinke, or give back, according to the greatneſſe of the weight, then you muſt put plancks, blocks, or ſome ſolid thiug vnder the feete, ſetting tent pinnes about it, according as neceſſity ſhall require, and as opportunity will permit you.

Your *Fearne* then being thus firmly placed and ſetled, the *Gunner* ſhall get vp by a ladder, or ſome ſtepps to the head or top of it, having the rope in his hand, ſhall put it through the vppermuſt truckle of the head, and let it fall downe to the other, that he which catches it may put it through the left ſide of the peece in his hand, to faſten it, as wee ſhall ſhew hereafter, into the eares of the peece, and ſo having put it through them, he drawes it vp till he can give it to him that is aboue him, and then he putts it againe through the hole of the right hand truckle, and gives it downe to him that is vnder him, who reaches it againe to him that is above; and ſo he faſtens it to the head of the *Fearne*, giving it ſome turnes, till it comes under the vppermoſt truckle, as you ſee.

This done, he muſt faſten it (with great diſcretion) to the lower truckle, by puting the rope through the eares of the peece, putting the end of it thorow three times, as well through the eares, as through the ring which is under the ſaid truckle: after this, you ſhall beginne to hoiſe your peece, putting a great, and a long peece of timber into the mouth of the peece to guide it a right, that it doth not ſwagg from one ſide to an other; a dangerous thing, which ſtricking againſt one of the feete of the *Fearne*, or againſt the Rouler, may breake it, and ſo hinder the whole worke. Thoſe which mounts it, muſt have a care to keepe the peece ſteddie and right, untill the weight of the peece is well ſetled. The *Generall* or his *Lieutenant* Generall, in the meane while having a watchfull eye, as well vpon the ropes, as vpon the feete of the *Fearne*; that the feete do not ſlip away, or the rope be cadgeld one among an other, or drawing not a like, may breake. Therefore, when they beginne to hoiſe the peece vp, they muſt give a blow or two with a ſtaff vpon the ropes, to part them a ſunder, one from an other, that each may beare an equall weig' t.

If you perceive that your *Fearne* beginnes to give back, then you muſt preſently let your peece ſinke, and vnderlaye, and ſettle well the feete of it, and that as gently as may be, to the end the *Croſſe beame*, or Rouler may not be diſioynted, or broken.

Finally, giving two or three turnes to the *Maine rope*, vpon the *rouler* or winder of the *Fearne*, you muſt winde it vp carefully, and very gently with the help of two men only: in ſuch ſort, that when one of the levers, or handles hath gone about, the other muſt be held faſt, till that the other man hath putt his in its place, to make likewiſe its turne about: or elſe the other man ſhall ſtay his hand, till that his fellow drawing out his, hath put it alſo in its hole; which muſt be done ſo often, till the peece be hoiſed ſo high, that you may put your Carriage vnder it.

Alſo you muſt take heede that your peece knocketh not againſt any part of your *Fearne*, which might cauſe any *diſaſter*, or that the *Fearne* might breake, and letting the peece fall, a miſchiefe may happen, and put all into diſorder: wherefore you muſt put the carriage under it very gently, that the *Tronions* may fall juſt into the holes or claſping ſockets of the carriage, and ſo guide your peece by the beame which it hath in its mouth, that it falls ſoftly to reſt upon its carriage, and then locking it well in, and faſtning it with the wedges, you may then looſen your ropes, and taking away the *Fearne*, your peece being thus mounted you may draw it whitherſoever you pleaſe.

Practi-

HOW A CANONIER OUGHT TO CHARGE A PEECE.

CHAPTER VI.

A Peece being brought to a *Batterie*, and planted upon a *Platforme*, having powder, bullets, his linſtock, ſcowrers, Rammers, and all things elſe in a readineſſe, after he hath ſtuck down his linſtock in ſome place under the winde, and firſt carefully cleared his peece with his ſcowrer and sheepe-skin within, and ſees that the touch-hole be not ſtopped, or any duſt or filth cleaving to it, then one of his Companions, which is to aſſiſt him, (for commonly there muſt bee two Canoniers to every Cauon, or great peece of Ordnance) brings him the *pouch barrell*, with powder iuſt before the mouth of the peece, and putting his Ladle or charger into it, fils it, and leaſt it might be overfull, giues it a little iogg, that the *Surplus* may fall downe againe into the barrell, after this he puts it gently into the mouth of his peece, even till the end of his Ladle comes up to the very brich and touch-hole of his peece, and then turnes his Ladle ſoftly, and lets it lye within the chamber of the peece, and drawing out his Ladle almoſt to the mouth of his peece, puts it back againe to take up the looſe cornes, which were ſpilt by the way, and to bring them up to the charge of powder: this done he drawes out his Ladle, and takes out of the *pouch-barrell* a ſecond Ladle full (for by triall before, he knowes the weight and charge of powder, which his Ladle will hold, and which his peece will require) and ſo putting in his ſecond Ladle full up to the former, drawes it out, and doth as he did before, that no looſe cornes may lie in the bottome of the mould of his peece, and in drawing out of his Ladle, he muſt haue a care, that he let fall any powder upon the ground, for it is a thing unſeemely for a Cannonier, to trample it under his feete. Then he takes a wiſpe of ſtraw, hay, or any other thing: and puts it ſo hard into the mouth of the peece (turning his ladle to come to the end of his Rammer) hee driues up the wispe and carries up with it the looſe cornes, which happily may be by the way in the mould of the peece, even up to the charge of powder, and then giving the ſtopper and powder, two or three shoues, to make it lie cloſe together in the chamber of his peece, he drawes out his Rammer, puts in his bullet, which roules gently into his peece up to the wiſpe or ſtopper which keepes up the powder (all this while his *Companion* ſtopping the *touch-hole* with his finger, that no powder flies out of it, but that it be alſo well fild and ſtopt with powder which hee may do out of his *touch-horne* afterwards) and then puts in his ſecond wiſpe after his bullet. And the Canonier is to be forwarned, that he ſtands not iuſt before the mouth of his peece, while this is a doing, but aſide of it, leaſt a danger or miſchelfe might happen to him, and thus the peece having its due charge both of powder and bullet, he ſhall cover his touch-hole with a dry sheep-skin, after he hath levelled his peece, and ſetting away his pouch barrell of powder with the reſt, in ſome *Concaue*, or hollow hutt into the ground covered over with ſodds or earth, he ſhall attend the Gentlemans of the Ordnance his command before he giues fire.

An other obſervation for a Canonier.

Touching the charging of a peece *Frons-berghen* maintaineth, that one ought to take in powder one half of the weight of the Bullet. Rivius and ſome others are of the opinion, that the more powder one puts in, the ſwifter and further the bullet wil fly shewing many reaſons to proue it. But experience the miſtris of this Art teacheth us otherwiſe: for a peece being loaded with two third parts of the bullets weight in powder, ſends the bullet going more ſwiftly, and will carry it further, which hath bin ſo often tryed, that it is without all contradiction, giving this reaſon, that the *exhencia* is ſo ſwift and violent, that it burſteth out of the mould before the two third parts of the powder be fired, and this hath beene found irrefutable.

Again others maintain, that if one should forcibly ramme in the bullet then the powder might take fire, ere it could caſt out the bullet, and then would cauſe the bullet to fly further then otherwiſe it would do, But you muſt conſider in ſo doing, you either endanger the breaking of your peece, or elſe make it crooked and unſerviceable, becauſe your ordinary peeces will not bear ſo great a charg of powder, this hath bin tryed upon the Sea ſtrand at Scheveling by the Hagh in Holland before his Excellency prince Maurice of famous memory, where firſt one and the ſame peece was loaded with ten pound of fine powder to ſee how far she would carry her bullet. The place being marked where the bullet reſted, shee was loaden again with 9 pounds, which shot as far as the ten pound did, but laſt of all shee was charged but with 7 pounds of the ſame powder, which carried her bullet further then the two former shots: wherce one may obſerue that a peece of Ordnance may be overcharged and therfore a good Gunner ought to haue a ſingular care to giue his peece her due meaſure and charge.

Of the Gunners ſervice in generall.

NOw foraſmuch as Ordnance are Engins of force, reaſon, waight, & meaſure: & the Gunners men exerciſed & experienced in them, & their apurtenances in making platforms with defences, Troniers, Gabbions, Loopes, Parapets of earth, & Faggots about 23 or 24 foot high, of Faggots of 2 foot high of earth, bed upon bed vnto eleaven foot high, & after 3 foot of Terraplene, to raiſe the Troniers and Loopes, ſo that for the Cannon it be 3 foot wide in the Barb & within 12 foot wide without the lower part therof to defend ſcarpwiſe the better to diſcover the Enemies auenews, and offend them the more freely, for auoyding the blaſt and ſmoake, and ruine, it would elſe make: For the Culverings 2 foot & a halfe within & 9 foot without will ſuffiſe, & for leſſe peeces, leſſe meaſures. If the Battery be to be made with Gabbions, they being filled with earth without ſtones, moyſtned, & rammed 7 foot a peece in dyametre, 3 rankes between 2 peeces, if the place will permit or 2 at the leaſt, and 3 rowes alſo one before another, ſetting one betwen two, ſo if the 1 ranke haue 3, the ſecond will haue two, & the third one, but it will be hard to make a ſafe Battery with Gabbions, Cannon, or Culvering proofe: And each platforme is to haue 30 foot for the reverſe of the Cannon, and 27 foot for the Demy Cannon, he ought to ſee that it be levelled, or riſing 1 foot for 20 backwards the better to ſtay the reverſe and facility, the bringing the peece being loaded to the Loop: He ought to ſearch and examine, the goodneſſe of the peeces, their Ladels, Rammers Spunges & Tampion, fitneſſe & roundneſſe of the shot, force and goodneſſe of the powder and match; And to ſee all fitted accordingly, & to place the powder covertly, hid ſafe from the fire of his owne as alſo of the Enemies Ordnance, to ſee the Gunners take their markes toward the under part, giving each under Gunner his charge.

HOW A CANNONIER OVGHT TO LAY AND LEVELL his Peece and to amend a bade shott,

CHAPTER VII,

HAving time and Command to lay and Levell a Peece, according to the ordinary ayme, to try how farr it will cary, the *Canonnier* shall take a long ruler, and laying it vpon the midſt of the *Frizes*, aſwell of the brich, as of the *muzzle* of the peece, and a levell upon it, he shall raiſe it, , or ſinke it, untill the plummet of the Levell be iuſt in the midſt: then taking away both the Ruler and the Levell, he shall ſee even with the Frizes, the point or marke which this ayme diſcovers, which without doubt will be the place it will cray too; with which according to the levell of the mettell, whereof wee will ſpeake hereafter, it will make but the halfe.

But if he hath no leiſure ſo to uſe the *Ruler* and *Levell*, he may take his ayme, or lay his peece, as he finds good, according to the charge, and proportion of his peece. If he ſtrickes his marke, he may then be aſſured, that his ayme is right, and uſing the like weight of powder, will alwaies make the ſame shot.

But if his bullet carries over, he shall levell his peece againe as he did before, and having got the firſt marke in his ſight, he shall neither ſtirre nor moove his peece: but shall take away aſmuch of the *Frizes* of the brich, till he ſees the blow which the bullet giue, and which will bee the true, and right ſight, which he preſently may trie by laying his peece upon his firſt marke, which without any doubt he will ſtrike

Now if his firſt shot fals short, then he muſt doe as he did before, levelling his peece againe, & then without mooving it, he shall goe and take away the *Frizes* from the *muzzle*, till hee diſcovers the blow of the bullet, and then he shall haue the true ſight; according to which, laying his peece upon the firſt marke, hee will ſurely ſtrike it, if that there bee no fault in the powder.

There is an other way of levelling of a peece, and amending of a bad shott, in adding or diminishing the elevation, according to diſcretion. To witt, when he shootes short of his marke, the peece is remooved and layd as before, afterward he raiſes up the *Muzzle* as he shall iudge, and as neede shall require, that he may ſtrike his deſired marke, obſerving well alwaies how much this elevation is made higher then his firſt ayme taken, which he shall perceiue if looking even with the mettell, he shall ſee what marke it will show him

How a Cannonier ought to Levell his Peece.

Then giving fire, and ſtriking the marke before aymed at, he may be aſſured, that his peece carries right, to which henceforward hee shall giue as much height aboue the naturall Levell: if it failes, that is, if he over shootes his marke, let him diſpart that which his firſt shot fell too short, with the length of the ſame, for the leſſening of the Elevation proportionably; in doing whereof, without all queſtion hee shall ſee his shott remedied, and a right shott made. And this is your common and ordinary way in which Gunners do moſt exerciſe themſelues in, with aſſurance that he which knowes not by this meanes to giue the right elevation and range to his peece, is not worthy of the name of a *Cannonier*. Now for his better underſtanding I will giue him this example.

Suppoſe a *Canon* be mounted upon his carriage, and planted upon a *plate forme*, and is to make a shot at ſome *white-ſtone* or marke in a Wall. To doe this, your Gunner muſt take his ayme as curiouſly as poſſibly he can Levell with the mettell of his peece, but if his shot fals two short, to helpe it he shall take his ayme againe, and shall lay his peece as hath beene taught before: afterward he shall raiſe it a point higher, ſo that whereas he had but 6 before, now he hath 7 points of the elevation, and afterward giues fire. If he ſtricks his marke let him alwaies take the ſame ayme and Levell. But if he over shootes his marke, let him levell his peece as is taught before: by diſparting the difference of the firſt, from 6 with that of ſeven points, as diſcretion shall guide him, according to the carriage of the firſt shot, and giving fire, (without all doubt) he shall hit his deſired marke. And his Peece being thus raiſed he muſt keep in his ſight the point or marke which is showne him, and obſerue well the height which is aboue his marke, with aſſurance that when he is to make more shot by keeping this elavation he wil never faile. But if the firſt shot lying upon the 6 points be to high, then he shall helpe that by the ſame Rule in laying his peece lower, & ſo shall ſtrike his marke whereby he shall get credit and commendations for it.

A new deviſe by any ſtaffe, to levell, mount, and imbaſe any peece.

ALſo any peece, may with a field *Linſtock*, *Rammer*, or *Spung*, or other *Staffe* be mounted to any degree of the Quadrant, being thus prepared, Firſt, marke from one end of that Staffe a diſtance, equall unto the height of the Pomell or Caskabell of the Peece, placed levell upon her plat-forme, and then take the diſtance between the Centre of the Trunions and the Pomell or Caskabell, which make or imagine a ſemediametre of a Circle, & divide it by diagonals or paralels, or otherwiſe into a 1000 equall parts. Laſtly out of the table of *Sines*, take the number anſwering to every degree out of the ſaid 1000 parts, and ſet that diſtance from the ſaid mark downwards. And if the total *Syne* of the Table be 100000 omit the two laſt figures of each number therof toward the right hād, & if it be 10000000 then omit 4 figures of each number you finde in that Table & the remaineing number will ſhew how many of thoſe 1000 equal parts are to be ſet downwards from the mark beneath the ſaid levell for each ſeverall degree: Then drawing alſo 10 Paralells or Diagonalls from the firſt degree to the ſecond, and from the ſecond to the third &c. ſucceſſiuely continued from each to his next, noting every degree with Arithmeticall characters, ſo you may frō ſix minutes to ſix minutes by thoſe right ſignes mount the peece. ſo ſet forth for any peece which it ſhall be prepared for. This may alſo be deſcribed upon ſuch a Staffe without the Table of ſynes in a mechanicallmanner thus, If you deſcribe a Quadrant or quarter of a circle with a ſemidiametre, equall to the diſtance from the centre of the Trunions, to the centre of the Pomel or Caskabell and devide the Arch of that quadrant into 90 equall parts or degrees, and then from each degree letting a line fall perpendicularly upon the baſe ſide of the ſaid quadrant: And laſtly, each of thoſe right lines being thence transeferred from the ſaid firſt marke downewards vpon the ſaid ſtaffe, and marking them with Arithmeticall figures for each degree, therevpon makeing alſo Paralels and Diagonalls as afore-ſaid you may therby Geometrically and mechanically marke the ſame from 6 to 6 minutes as before. The vſe of them are plaine and eaſie, for if you bring downe the centre of the caskabell or Pomell of the peece to any number of the degrees thereon ſo marked, for that peece, you ſetting the lower end of the ſtaffe to the plat-forme being even, although it be riſing or deſcending backwards: I ſay then the Axis of the bore of that peece will be found to be elevated unto the degree aſſigned: If you be to imbaſe the peece, thoſe lines & number alſo ſet aboue the firſt named mark, will performe the like office there, in the thing required.

OF A QVADRANT LEVELL, AND OTHER INSTVMENTS for Ordnance, and the uſe of them.

The forme, proportion, and making of a quadrant and a Levell, with an inſtrument to ſhew the uſe of it, is very neceſsary for maſter-Gunners; *and* Canoniers, *for the Levelling and ayming of Canon, other Ordnance, and Morters demonſtrated in the fift plate, and 15. 16. and 17 figures following.*

CHAPTER VIII.

TO make a *quadrant*, as is fitting, one muſt firſt make the whole circle marked 1. which is devided by lines, running from its *center* into 48 equall parts; at the end of each is noted the number thereof, encloſed in a ſpace between two little lines within an other circle, and between two *Vergets* or ſmall *rings*, where you ſee there is a ſpace alſo, by which the ſaid line is devided equally in the midſt.

With a quarter of this circle is made your *Quadrant* marked (2) being from *1* devided into twelue points, making ſeven degrees and a halfe, ſo that in all they make 90, which is iuſt the fourth part of the 360 degrees of the whole circumference of the world.

It may alſo be devided, as you ſee upon the white, each on the outſide, into 45 points, whereof every of them make 8 degrees: ſo that the whole 360 degres are comprehended within them, according to this *forme* and deviſion is made your other *quadrant*, noted (3) and is marked with, *A. B.* and *C.* devided into 9 equall parts, each of them making 10 degrees.

Now by theſe two *quadrants*, the plummet hanging in the midſt from the point of the 45 degree, which are alſo devided into two equall parts, is showne to you the higheſt elevation and range of a peece, yea as farre as ever the peece is able to carry at length, as you may ſee in the figures following of a Canon and a Culvering.

The like is alſo showne you by the *Levell* marked (4) for the ayming, and levelling of peeces, when you are to take your marke aright, which alſo is uſefull for the making of your *platformes*, and beddings for Ordnance, all which are neceſſarie for the Art of Gunnerie.

This may alſo be made by a *quart* of the former Circle, if you devide it into 12 equall points, and ſo noted and ordered, that you muſt beginn to count from the midſt of it, towards the ends or ſides to the 6 point, ſo that your *plummet*, being upon the 6 point iuſt as the others, you ſhall, finde that your peece is layd at its higheſt elevation and range.

The *Cartabon* (or your foureſquare levell) marked 5, comprehends alſo all the circle aboue-ſaid, and is devided into 48 pointes, according to the foure quarters of the world, that is, *Eaſt, South, North, and Weſt*, making alſo foure particular *Quadrants*, whereof the forked dart comming from the center, or midſt, showes all the lines, not onely of the *Circle*, but alſo of the *Quadrant*, or your foure ſquare levell, and running in a line from the midſt, marked with O and N or with O and S, it will make a *Levell*, and is in the firſt degree of the right *Quadrant*, but comming from the midſt, and betweene the ſaid lines, it will shew you your higheſt elevation, as the other Quadrants haue done. The handle noted *E. F.* (if it be poſſible) muſt be 2 foote and a halfe long, whereof each foote muſt be 16 ynches, to the end it may make iuſt 40 inches, that is 3 foote and foure inches of our ordinary foote, which is an ordinary pace, or halfe a Geometricall one.

Of a Quadrant Levell, and the uſe of them.

Each of theſe ought to haue in the midſt, & at the end a little hole going frõ t'e one ſide of the handle to the other, which ſerue for this uſe, that this inſtrument being ſet upon the brich of your peece, looking through one of them aboue the higheſt *Frizes*: you may giue a shroud geſſe how farre your peece will carry the bullet, according to the length, condition, and proportion thereof. The two pins which you ſee on the ſides of it, marked C F ſerue to this end, that thereby you may diſcerne the quality of the place, which you would meaſure, the point deſſigning by its fall from the Eaſt towards the North, the length, bredth, depth, and height of the ſame. Finally this inſtrument contayneth many miſteries of great conſequence, and is of excellent uſe both for an *Inginier*, and a *Canonier*.

The common rule, whereby a *Canonier* may know how farre his peece will carrie, and how farre from one degree to an other, according to the *elevation* thereof, let him firſt ſee how many

paces it will carry being layd *even with the mettell*, which afterward he shall devide by 50. and multiply the *Quotient* by 11. and that will bring out the number of the further digreſſion or range, which if he devides againe by 44. he shall then finde the quotient to bee the iuſt number of paces: which the bullet will looſe in the other ranges degree by degree: as for exſample, A battering Canon will shoot its bullet being layd even with the mettell, a thouſand ordinary paces, at 2 foote and a halfe the pace, which being devided by 50 your *quotient* will giue twentie, which being multiplied againe by 11 it will giue 220 paces, which is the number of the next digreſſion made in the ſecond degree of the *Quadrant*, or the firſt after the Levell abouesaid.

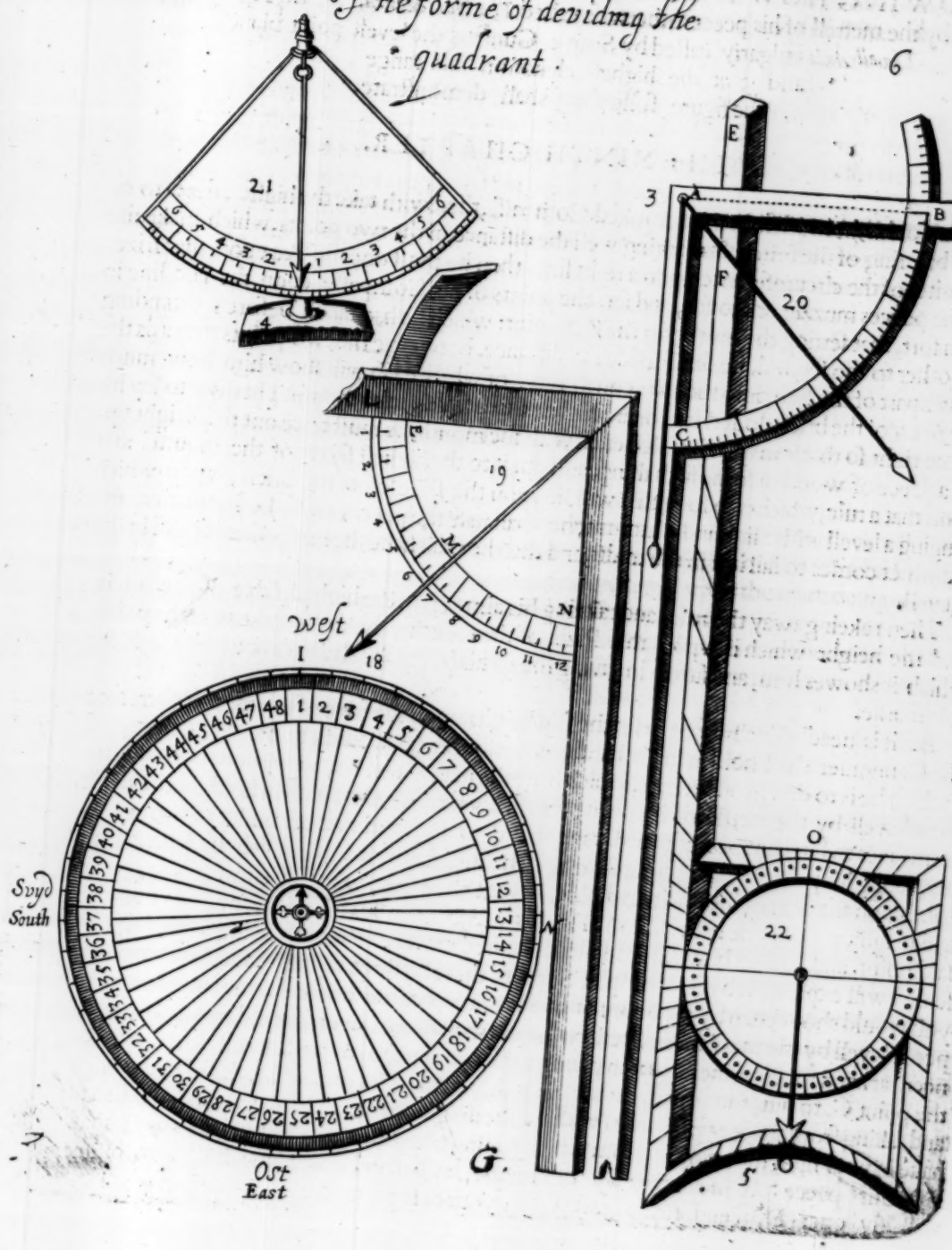
But all the other *digreſſions* or *ranges*, do alwaies diminish even unto the fiue and fortieth degree. To know then what this diminishing is from degree to degree, even unto the 45, which is the highe ſt elevation, you muſt take the iuſt number of the digreſſions from the firſt to the 45, which wilbe 44. now deviding them by the former number of 220 paces, you shall find your *quotient* to be 5 which is the number which goes alwaies decreaſing from the firſt to the laſt digreſſion: ſo that your Canon being layd upon its naturall marke, in which it is raiſed a degree aboue the levell, even with the mettell, making 1000 paces as is ſaid, being layd upon the ſecond degree, adding 220 paces to it as an advantage, then it will carry the bullet 1220 paces before it ſtopes. Againe you may add the ſame to the third degree, but the former being the greateſt digreſſion, as wee haue taught this then, and all the others will alwaies diminish 5 paces and will make but 215 aboue the 1220 of the ſecond degree, ſo that you shall haue in your third degree 1435. paces. In the 4th. degree 1645. In the 5th. degree 1850 paces. In the 6th. 2050. paces. In the 7th. 2245 paces. In the 8th. 2435. In the 9th. 2620 paces. In the 10th degree, which is the firſt of the *Quadrant* of 9 points it wil be 2800 paces. In the 11th. 2975. In the 12th. 3145 paces. In the 13h. 3310. In the 14th. 3470 paces. In the 15th. 3657. In the 16. 3775. In the 17th. 3920. In the 18th. 4060. In the 19th. 4595. In the 20th. degree, which is the firſt of the ſecond point, 4325 paces. In the 21. 4450, In the 22. 4570. In the 23. 4685. In the 24. 4795. In the 25. 4900. In the 26. 5000. In the 27. 5095. In the 28. 5185. In the 29 degree, 5270 paces. In the 30. which is the begining of the third point, 5350 paces. In the 31. 5425 paces. In the 32. 5595. In the 33. 5560. In the 34. 5620. In the 35. 5675. In the 36. 5725. In the 37. 5770. In the 38. 5810. and in the 39 degree. 5845 paces.

In the 40. point, which is the beginning of the fourth point, 5875. paces. In the 41. 5900. In the 42. 5920. In the 43. 5935. In the 44. 5945. Laſtly in the 45. when you reckon but foure halfe points of the Quadrant, you haue the higheſt elevation or range as you shall ſee in the figure following, which maketh 5950 paces.

To conclude, a skilfull Canonier exerciſing himſelfe herein, will eaſily conceiue, and know certainly how to Level his peece vpon any one of theſe degrees and points, and how farre it will carry be it great or little: for this calculation will never faile him, by obſerving this, that in giving the chaſe or elevation of his peece, in what point ſoever it be of this rule or degree reaches from 1 inch to 16. which is a Geometricall foot, the next chapter following shal shew him the vſe of it in levelling of Ordnance after three maner of wayes, to wit, *even*, or *levell with the mettle point-blanke*, or upon a *higher elevaion* at a range.

Practi-

The forme of devidmg the quadrant.



SHOWING HOW A CANNONIER SHALL SHOOT LEVELL by the mettell of his peece, otherwise called *The Horiozontall Levell*, 2 or by *the Levell Axis* vulgarly called by Some Gunners the levell point blanck, and 3 at the higheſt eleuation and range, as the figure following shall demonſtrate.

THE NINTH CHAPTER.

To do this, he muſt firſt take a crooked Compaſſe, therewith take the higheſt frizes to or baſering of the britch, & marking well the diſtance of the two points, which make the diamiter of the circumference vpon a right line, then he muſt doe the like vpon the frizes of the peeces muzzle or mouth, and ſett the points of his Compaſſe vpon the ſaid line in ſuch ſort, that ſetting the one vpon the firſt point: which he had taken before, extending the other to the ſecond, he shall divide the diſtance, betweene the two points towards the lower part of the line, into the two equall parts, of which each will show him how much the *frizes* of the brich doth differ, or are higher then thoſe of the mouth. Therfore to lay his peece right, ſo that it may be levelled euen with the mouth, he muſt trace out this height vpon a peece of wood or ſome ſuch thing, and put it to the higheſt frizes of the mouth, and vpon that a rule, which is ſo long that will lie vpon the frize of of the brich, vpon which hanging a levell with a line and plummit, he shall raiſe the peece, or ſinke it, till that the plummet comes to fall iuſt in the midſt, and then he shall haue the boore therof right in the Levell.

Then takeing away the rule, and takeing his aime vpon the higheſt frize of the brich, and the height which is vpon the frize of the mouth, he shall marke well the point, which it showes him, and ſurely in giving fire to his peece, he shall without failing ſtrike his marke.

But it is needleſſe allwayes to ſet the ſaid height vpon the frize of the mouth, therefore the Cannonier shall hold it in his hand, whenſoever he would shoote vpon this point (which he is to do vpon batteries, which haue the marke neere enough) and shall take his aime levell by the mettle of his peece, as vſually he doth til he hath in his ſight the mark he meanes to hitt, but becauſe the diſtance being to neer, and that the bullet may carry ouer, leting his peece ſtand without ſtirring it, he shall ſet the height, which he hath in his hand vpon the frize of the brich, and obſerve well the point which it showes aboue, the ſaid height, and after he hath it, he shall lay his peece again levell by the mettle vpon the ſaid point, and he shall hit without faile his deſired marke. but this being ſomthing obſcure I will explaine it by an example, Suppoſe there be three points as D. A. C. and that you would shoot euen by the boore of the levell vpon the point A. you muſt lay your peece levell by the mettle, but queſtionles you shall shoot ouer it, the diſtance being to neere at hand for his aime; ſo that in giuing fire to your peece the bullet will come to ſtrike the point C. to hitt, then iuſt upon the point A. you muſt ſet the ſaid height vpon the brich and taking from thence your aime (without mouing your peece downwards) you shall haue in your ſight the point D, from which hauing taken away the ſaid height, you shall lay your peece againe levell by the mettle, as before, and giuing fire, the bullet will fly ouer D. and ſtrike iuſt vpon your deſired marke A.

If occaſion were, that you would shoot at a mark: which is to far for the aime, levell by the boore, and notwithſtanding is ſo neere for the ordnance levell, a Canonier muſt vſe this diſcretion, to witt the diſtance being a third part further he muſt then take away a third part of the height, and if it exceeds the carriage of the levell two parts, then he muſt alſo take away two parts & he shall shoot ſo right, that if it were for a wager he would hit a shilling or at leaſt a hat without fayling.

This is your ordnance pointeries againſt batteries, which according to the inſtruction giuen before, one ought to approach, as neere an enemie as one can, ſo that if you do not

take

take heed to lay alwaies this heigth upon the brich of your peece, you will alwaies over, shoot your mark, contrary to the deſire of a good Canonier, which is alwaies to beat up on the foot, or foundation of a wall, that it may tumble down, and be battered the ſooner for the eaſier entrance of a breach, obſerving that it is one of the principalleſt conſiderations in all shots, that in making a good shot one levels his peece at the foot of his mark, eſpecially in shooting at a troup of horſe, or a company of foot. But in a ſtony place, a Canonier doth willingly shoot short, becauſe in ſtriking upon the ſtones or brickes, in rayſing them, he makes a hole much greater, then the bullet which goeth through them.

But in a plain place one muſt lay his peece ſo, as the bullet may take them iuſt in the middle, or about the girdle, and ſo may kill a whole file, or a rank at a shot, yea though they should all fall flat down upon the ground, yet they cannot all eſcape, otherwiſe if you level too high, it may be accounted but as a loſt shot.

To amend then a shot too high for this mark, you muſt levell your peece upon the white or marke you shoot at, then going to the mouth of your peece with a levell line, and a plummet, and take there the height of the higheſt frize, or ring to the bottome of the boore, which you shall ſet to the frize of the brich, and from thence, and aboue the frize of the mouth, you shall take (without ſtirring the peece) your aime, markeing well the place it will shew you, then taking away the ſaid heigth, you shall lay your peece again upon the point it showed you, and ſo without fayling, you shall hitt the mark you deſired.

But if your peece carries too short, it muſt be amended in this manner, lay the peece as before, then going to the mouth with your line and plummet, take all the heigth of the frize from the top to the bottome, in ſuch ſort, that your line may take the whole Dyamitre of all the circumference thereof, and by this dyamiter, you shall take the thickneſſe of the mettle from the bottome of the boore, even to the loweſt part of the ſaid frize, and laying this heigth upon the brich of the peece, and levelling it upon the mark deſſigned, which you would shoot at, you shall ſee the good effect it will take.

Now for a shot that is made on either ſide of your mark, it is to be helpt in this manner following, if the bullet fals on the right ſide of it, then you muſt lay or mooue your peece, and take your aime ſo much on the left hand, and that you may not faile a hares-breadth, now to make the diſtance of the one and the other ſide alike, you shall levell your peece as before, right upon your white, then take a long ruler, which you shall lay upon the frizes, aſwell of the brich, as of the muzzle, & leaving it upon the mouth, you shal take your aime removing it at the brich ſo long, till you haue got in your ſight the place of the ſide shot, which your bullet made, and without taking away your eye, or your hand from this ſight, removing the brich of your carriage, till the brich of your peece, comes to be right in the midſt under the ſaid ruler, which being done, take away the ruler, and take your aime level by the mettle of the peece, and you shall find your peece to be turned iuſt, as much towards your left hand, as it shot before on your right hand.

Moreouer, there are many occaſions, which may cauſe a bullet to ſtraggle, either on the one ſide, or on the other. The firſt is, when the boore is boored more on the one, then vpon the other ſide, or by reaſon of the inequallity of the mettle, or that, the mould is not right. This cannot be imputed a fault in the Cannonier, but in the Founder: neuertheleſſe, if he be ingenious, he may helpe this fault by his diſcretion trying his peece by his creuſet inor ſcaling primer, and ſo help it as the fault may require.

A Peece alſo will carry ſidelings, if the tronions be not iuſt right the one ouer againſt the other.

Alſo if the platforme be not layd even, but that the one part is higher then the other.

Item if a Canonier in taking of his aime ſtirs his eye from the iuſt middle of the frizes of the peece, and though he hath it, yet he may faile in not taking his aime iuſt in the middle of his mark.

Item if one wheele be higher then the other, the shot will fly alwaies toward the lower ſide.

Item if one of the wheeles should ſtay upon a naile, and the other not, as likewiſe when the one turns more eaſily then the other, and if one wheele should ſtand upō dirty ground and the other on hard, or when one of the Cubes, or heads of the wheele is longer then the other.

Item when the bullet is not driven home alike, or lies more upon the one ſide of the boore, then upon the other. And Finally the ſtraying of the bullet upon the one ſide may be cauſed by the vehemency of the winde, when it cannot be holpen.

Likewiſe a short or an overshot may be occaſioned either by the force or the weakeneſſe of the powder, or by reaſon of the unskiltulneſſe of the Gunner, who knowes not to lay and levell his peece aright, neither knowes the true diſtance of the mark wherat he shootes.

All which I haue marked at large, not as a matter to excuſe an inexpert Cannonier but to giue adviſe to the wiſe, to haue a vigilent eye upon all things, and to follow the rules aboue ſaid, and ſo to prevent all inconveniences: for to faile the firſt time may paſſe, the ſecond may be pardoned, but the third time is to much & cannot be excuſed, becauſe it is a certain ſigne of want of diſcretion and iudgment. And indeed there is no fault as we haue shown but by diſcretion may be remedied, whereof we haue ſeen many examples at the famous ſiege of Oſtend, wherein a ſound iudgement was shown in this kind, wherof I will relate two examples.

A ship running into the haven to get into the towne, which brought the Enemy ſome proviſion, a woman ſatt at the helme of the ship, to make us asham'd, order was given to a Canonier, that he ſhould make a shot at this fleereſſe, who thinking it was too cruell a thing to shoot at ſo weak a ſexe, offered to take away the helme from between her hands, and to make the boat come floating towards us, with the ſloud: if she were not provided with an other, which he preſently put in pra ize, levelling his peece ſo right and diſcreetly, that indeed shooting of the helme, it fell into the water, and this boate came floating towards our quarter, where it was pillaged, and burnt in ſight of our Enemies.

An other ship lying at anckor, staying for a high water to come into the Towne, our men to ſinke it, made many Canon shot at it in vaine, iudging that the diſtance was too farre to do it any harme: where upon they were forbidden to shoote any more at it, and not to ſpend their powder to no purpoſe: but at laſt there came a Canonier who promiſed not onely to ſtrike the ship but alſo to shoot the Cable aſunder ſo that by fauour of the water the boate ſhould come floating to our mercy, and indeede levelling his peece, and giuing fire to it hee shot the Cable in peeces, and to the great admiration of all our army, the boate came ſwiming to our quarter. Theſe examples I haue related and will do others in the following Chapters, to ſhew the skill of a good Cannonier, that hath diſcretion and iudgment in ſuch occurrences, and to giue encouragement to all Canoniers and Gunner to doe the like when occaſion ſhall ſerue.

The same Levell by the metall of the peece at a 1000 paces
The Levell Axis, or point blank at 500 paces

The first Dialogue.

BETWEENE THE MASTER, OR GENERALL OF THE Ordnance, and a Captaine, to know whether a Demy Canon, or a Culvering will carry furtheſt at the higheſt range, and how a Canonier muſt levell, and raiſe his Canon, and Culuering to try it, as the two next figures following ſhall demonſtrate.

GENERALLO SENOR CAPTAINE, I haue often heard that in trying of a Canon with a Culvering at randome, it hath bin found that the Canon will carry its bullet further then a Culvering, and indeede I ſhould be of the ſame opinion, if your diſcourſe perſwade mee not to the contrary.

Capt. My Lord there are many reaſons, which one muſt yeeld vnto that a Culvering will carry its bullet further then a Canon.

Gen. It may be ſo, yet I haue heard many men ſay, who haue tryed it, that a Canon will carry further, then the Culvering

Capt. It may well be, but I would fain ſee the tryall thereof, to the end it might be certainely knowne.

Gen. How ought then a due tryall to be made thereof.

Capt. Sure it is that a Culvering is mounted vpon a higher, and a longer carriage, then a Canon is, and that the croſſe-beames vpon which the brich of the Canon reſteth, being higher then that of a Canon, and the peece being longer cannot ſloope ſo much as to elevate its mouth ſo high as a Canon can, that hath its carriage ſhorter then the croſſe beames lower: for the ſhorter a peece is, the eaſier it may be elevated even to 45 degrees of the quadrant aboue ſaid, whence will follow, that a Canon being raiſed to a higher elevation, muſt needs carry its bullet further, then a Culvering, not that the fault is in it, but that it wants its due elevation, for if it could be raiſed to the ſame elevation and degree the Canon is, then you ſhould ſee the Culvering, would ouer ſhoot the Canon by far.

Generall. How ſo? then there muſt bee ſome fault in the Inginier, that made the mettall of it, or elſe in the Carpenter in the makeing or frameing of the Carriage.

Capt It may be in both of them, though they haue done their beſt endeavour, becauſe they haue not attained vnto the heigth of this perfection: for as in the Art of Gunnerie: ſo in the fabricking and framing of the other Engines and Inſtruments, there are many ſecrets in them, which a common capacity cannot ſo eaſely find out.

Gen. How ſhall we then diſcouer this miſtery, and to haue a ſure tryall therof, that the one peece may haue no more advantage then the other.

Capt. To haue a true tryall thereof, firſt the carriages of the one, and of the other muſt be ſo rightly fitted, and locked with croſſe-beames low enough, to giue both the peece one & the ſame elevation, as you may ſee in the figures following.

Secondly. They muſt be planted upon two plaine and euen plate formes.

Thirdly, if the Culvering cannot be laid vpon the ſame height as the Canon is, then you muſt take away ſo much of the Croſſe beame of the Carriage, that the brich of it may ſinck and the muzzle ly vpon the ſame elevation as the Canon doth.

Generall. What need is it then to take away ſo much of the Croſſe-beame, and ſo to weaken the Carriage, which may eaſelie bee remedyed by digging a hole in the ground, to make the brich of the carriage ſink into it, till the muzzle of the peece be raiſed high enough.

Capt. It may well be done, when there is no ſtrife, nor diſpute about it, to which the contrary

trary part is will never agree, because of giuing an advantage.

Gen. What advantage can there be in this, to haue a peece to ly vpon a plate-forme, & to haue the brich of the carriage sunke a little into the ground.

Capt. I am of that mind, that a peece, which hath the brich of the Curiage stept from recoyling, will shoot its bullet with a greater force and violence, then that which lies freet upon an explanado, or a plat-forme, And therefore to giue no advantage to a Culvering, it is better to shaue off some of the Crossebeames, to cause it to sinke lower, then to ly in such a ditch by raiseing the mazzell to the required height as you may see in the figuers follo wing.

Gen. I haue heard diverse disputes among good Cmoniers touching this point, Who thought that a Culvering, could not carry so farre as a Canon, because this peece being long, the bullet must go a longer way from out the chamber to the mouth, and that before the bullet comes out, the powder in that while may loose some of the strength thereof, whereas a Canon being shorter, and the flying of a bullet out of the Canon shorter, the powder willl send it going with a greater strength.

Capt. I beleeue well that there is some reason for what you alledg for the length of a Culvering, and the shortnesse of a Canon, when they are charged with that quantity of powder, as their bullets require: but for your Culvering, in regard of the length of it, you giue it a greater charge, whereas for the charging of your Canon, you giue it in powder but halfe the weight of his bullet, and to an ordinary Culvering, you giveit $\frac{2}{3}$ in powder, or the weight of the bullet, but being a Culvering renforced, you may giue it as many pound of powder as the weight of your bullet.

Gen I will demaund of you Sir one question more, and therewith conclude this discourse, If you were to shoot at ships upon the Sea, what peeces would you choose to be the best either your Canon or your whole Culvering?

Capt. Of this you may be assured from one that hath found it by experience, that there is no better peeces to do this then your Canon.

Gen. Giue me your reason?

Capt. Your Canon being shorter, may be laid lower, and better levelled, considering also that their bullets are greater and weightier then the others, & by more certain, because neither the wind, nor the humidity of the water, can haue any such great power to dead or hinder their flight.

Gen. How so? seeing your Culvering taketh a greater charge of powder, then your Canon, as you even now confessed is better, and will ding away the bullet with a more violent force.

Capt. My reason is that the wind and the moistnesse of the water haue more power over a lighter, then of Canon bullet, which is heavier then a Culvering, now if you were to shoot at a ship of a like distance, you must raise your Culvering to your thinking two pikes length higher then the ship is, whereas your Canon will require but one pikes length of elevation aboue it: Therefore I haue made many a tryall of it at the siege of Ostend, both of a Canon and of a Culvering.

Gen. Well Sir you haue satisfied mee, and given mee good reasons for what you say: but I pray you tell me whether a peece will carrie furthest, which is shot out of the Sea to the landward, or that which is shot from the shoare side, along the superfices of the water.

Capt. This were a hard question to resolue, if one had not made experience of it, Nevertheless I will tell you what I haue seen, that wee shooting into the Sea from our batteries in Dunkirke at the Enemies shipping, which rod before the Town, we could scarce reach them, But I haue seen with admiration, that the Enemy shooting from their shipping to us ward, their bullets flew from that place, five hundred paces further, then ours did, where wee stood, yea some of them into the very Towne of Dunkirke.

Gen. Surely I was of a contrary opinion, thinking that a peece planted upon the firme

ground, the bullet would flie further, and with a more violent force, then that which is shot from a floating ship, becauſe the peece in recoyling shakes the ship, and by the shaking therof, the bullet may looſe ſome of its ſtrength, but theſe are ſecrets in nature, more admirable then apprehenſible.

Capt. True it is, that there are many hidden and ſecret miſteries in nature, but for this one may alledg ſome naturall cauſes: for a bullet shot from a ship to the land-ward, ſeeketh its naturall reſting place: but that which is shot from the land along the ſurface of the water, the bullet is forced to ſtriue againſt two elements, that is firſt againſt the aire, which retaineth it with all might, and ſecondly againſt the moiſtreſſe of the water, which alſo deads the bullet, cauſing it to ſtoope, for this hath bin found by experience to be true, that a bullet will shoot further into the Sea at a low water, then it will doe at a high Sea.

Gen. If a peece were ſo planted, that one could shoot both into the land, and alſo into the Sea, by turning the ſaid peece, the queſtion is, whether the bullet would flye furtheſt over the Land, or upon the Sea.

Capt. A Canon will carry its bullet a thouſand paces further over the Land, then it will do upon the ſuperficies of the water, and though we haue had no certain tryall of it: yet the ſiege of Oſtend hath taught us this experience, that we may be aſſured of it: For in the channell by Newport, when the battle in Flaunders was fought Anno. 1600. we shot at the Enemyes shipping and men of warre, to make them giue back, that our men might come up along the ſtrand with more ſafety, and leſſe danger to fight, we found that our bullets, which were shot at them from the land, could not reach them to doe them any harme, but the Enemies bullets, which were shot from their men of warre, shot amongſt us, and flew fiue or ſixe hundred paces over our heads.

Gen. That might well be, for perhaps the enemies peeces were either greater or longer then ours, or elſe that they had finer and ſtronger powder then ours had.

Capt. The Calibres and boores of the one and of the other were alike, for their bullets fitted our peeces, but indeed in the goodneſſe of the powder there might be ſome difference, and for our parts to charge them well, we put a Ladle full of powder more then ordinary into ours, but this would not help. This queſtion I haue asked many times, both of Gunners, & Marriners, who haue given me alwaies this reaſon, that it was for ſome ſecret cauſe in nature, that a shot being made into the land, should fly further, then that which was made from the land into the water.

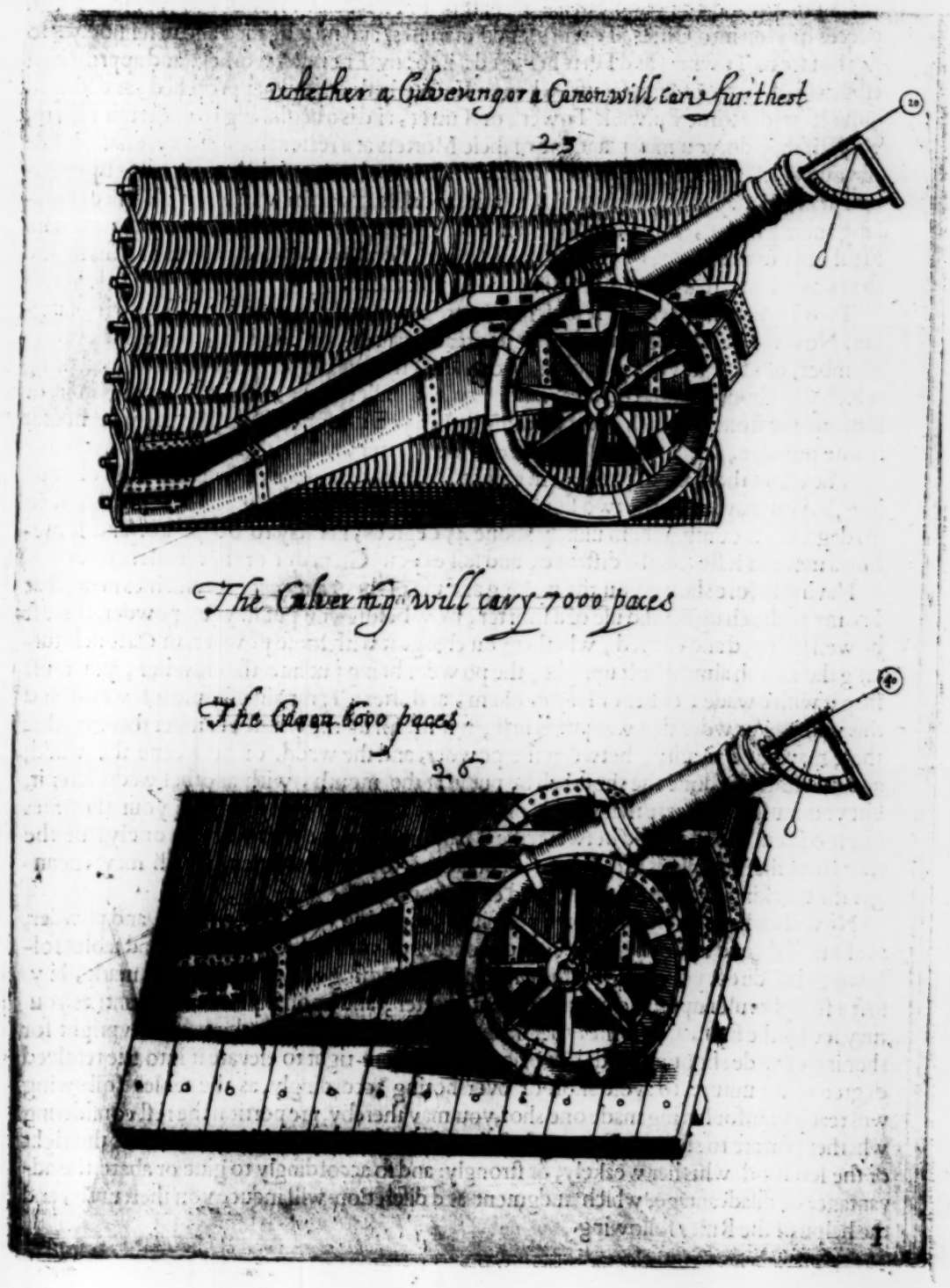
Gen. Though this troubled me a little yet I am glad to heare your reaſons, and the experience you have had. But I had almoſt forgotten to haue asked you one queſtion more, which now I call to mind, how comes it to paſſe, that all the charge of the powder takes not fire, and is not conſumed in a Canon, aſwell as in a Culvering.

Capt. This is not any fault or advantage in the peeces, for one would thinke that a Canon being shorter, and of a Larger bore then a Culvering a ſmall part of the powder might bee expulſed or driuen out before it be all fired, and that a Culvering being longe and ſtraight, might keepe it in the powder till it takes al fire, but this is done at a venture, and yet not withſtanding it happens oftner in a Canon, by reaſon of the biggneſſe of the boore, then in a Culvering for after you haue giuen your peece its due charge of powder to ramme it vp ſome what cloſſe into the chamber of your peece, you give it two or 3 shoues with the end of your Rammer, the powder being well corned; there lies ordinarily ſome looſe cornes & duſt by the way in the bottome of the mould, which the wispe or ſtopping hath not driven home, ſo that if a Canonier, doth not take very good heed, there will alwaies be ſome part of the powder shed in the peece, which will ly before the bullet, & when the reſt of powder takes fire thoſe looſe cornes flyes out, & cannot take fire, like as you ſee alſo that ſome shreds and peeces of the ſtopping after the shot is made, and ſmoaks without being conſumed by fire. So that your lo. may be aſſured that any peece of ordnance be it either short or long, if the charge of the powder be well ſtopped and rammed home and ſome

looſe

loose cornes which will fly backe gathered well vp by the wisp, there wil not be so much as one Corne, but will all take fire. This is seene also in the tryall of Bombards, and morters which though they be short, and large mouthed, fire and consume, all their powder, without loosing so much as a graine.

Gen. Now I vnderstand well, and confesse that hitherto I haue bin of the vulgar opinion attributing the cause to the shortnesse of the peece and herewith we will conclude. Here follows the figure of a Canon and a Culvering elevated by levell vpon one and the same degree of the quadrant to try which will carry furthest at range.



CONTAYNING THE DEMONSTRATION OF MORTERS, and the vse of them.

The tenth Chapter.

YOUR great and small Morters, are not onely serviceable in a warre offensiue, by shooting and casting of great *Granadoes*, as of a 100, 150, 170 pound weight, and smaller of 40, and 50 pound, but also by casting of Fire-balles, stones old rubbidge, and peeces of yron into Cities, Townes, and Fortresses, and may be vsed also defensiuely, to be shot from Townes, and Forts besieged, into any Enemies workes, and approaches, especially they are of singular vse, when an Enemy hath covertly approached, and lodged himselfe under some Bulwark Tower, or Turret, and is a beginning to undermine them, which if they do, you may plant one of these Morters at a reasonable distance, on the inside of your Wall, and shooting your *Granado*, as it were bolt upright into the aire, by its naturall fall, it may light iust into the Enemies workes, and there with great violence, breaking among them, it will make them cry, flye, and forsake the place, you may also fire them out of a place, by casting good store of *Hand-granadoes* down among them, and so annoy them, that the work will be too hot for them.

Two of these Morters are represented unto you, in the plate and figurs following number. Now for the shooting away of your great Granadoes or Fire-bals, you must ever remember, but to take ¼ or ⅓ part of fine powder of the weight of your granadoe or thing which you shoot, but if you are to shoot away a bullet without any fire workes in it, or some massie stone, or such like solid thing, then you must take but halfe the weight of it in fine powder, which having given fire to the Morter, will send it going merrily.

The vse of them is not to shoot in a right line, as other ordnance doe, but in an oblique line, as you may see by the two figures following, vnlesse your morter be mounted to 90 degrees, mounting them vsually aboue 45 degrees, namely to 60 70 80. and sometimes more or lesse, as the distance, and fall of your Granadoe or shot shall require.

Having before shown you the making and vse of the *Quadrant*, it remaines now, that I come to the charging and vse of a morter, now before you put in your powder, it must be well sponged and cleared, whether you charge it with loose powder, or Cartouch, turning the mouth almost bolt upright, the powder being put into the chamber, you must stop it with a wade, either of Hay or okam, and after a Tampkin of some soft wood, and this with the powder that was put in first, it must fill up the whole chamber thereof, that there may be no vacuity, between the powder, and the wadd, or betweene the wadd, and the shot, this done the shot shall be put in at the mouth, with another wadd after it, but you must haue a care that your Morter be not much mounted, least your shot flies out too soon, and the wadd between the Tampkin, and the shot will not onely saue the shot from the Tampkins breaking of it, but also is to avoid vacuities, which may endanger the breaking of the peece by second expansions.

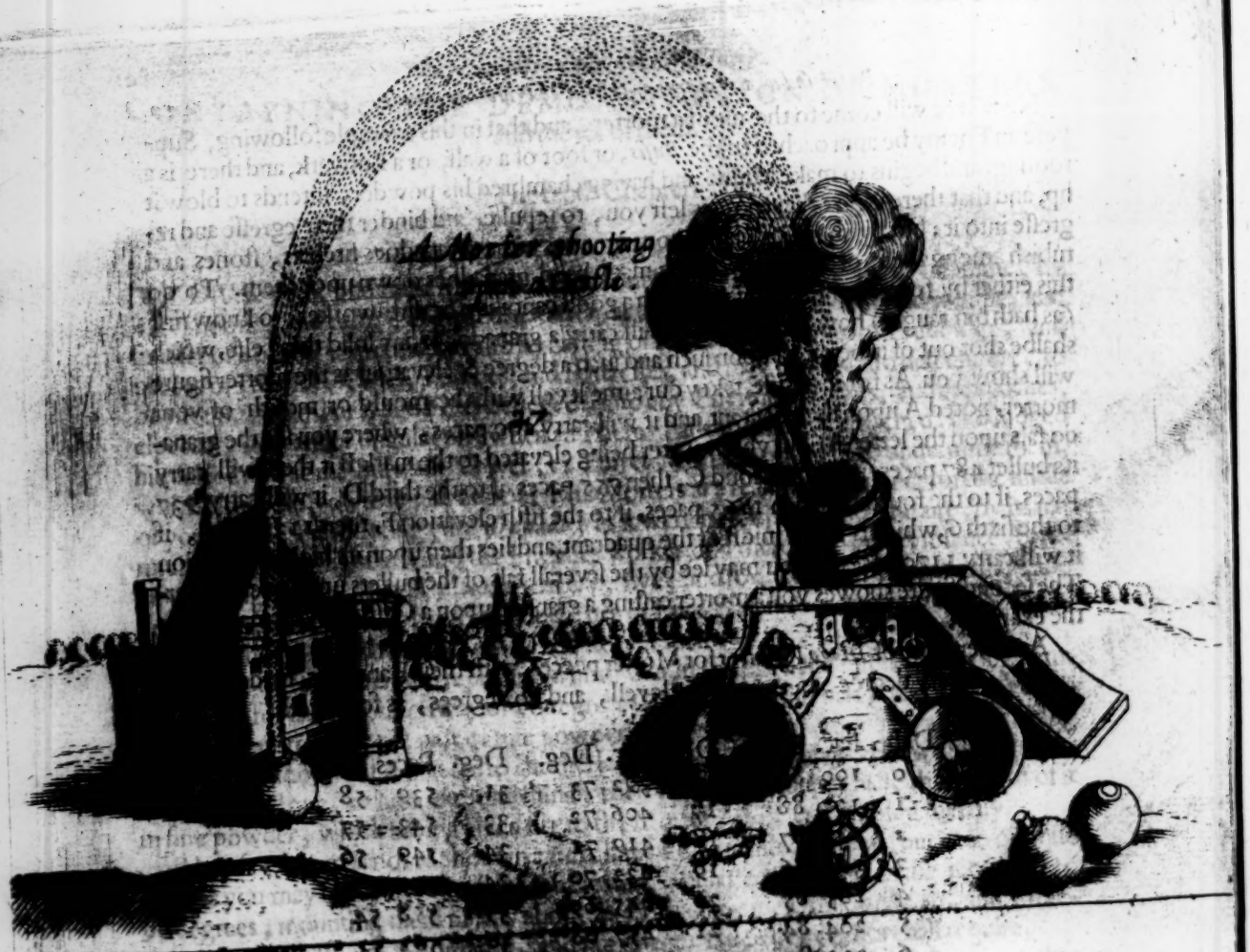
Now then having resolved of the premisses, touching your peece, shot, and powder, as about said, and upon the distance and monture of your mark, as the rules and tables following shall direct you, then for the bending and disposing of it to the assigned mark, lay first a straight ruler upon the mouth of your morter, and upon it place a quadrant (as you may see by the figures, or some other instrument crose-wise, to set the morter vpright for shuning of wide shooting, and then placeing them fore-right to elevate it into the resolved degree of mounture, to avoid short or overshoting accordingly, as the tables following will teach you, for having made one shot, you may thereby, proportion the rest considering whether you are to shoot with or against the wind, or whether it blowes towards the right or the left hand, whether weakely, or strongly, and so accordingly to giue or abate the advantage, or disadvantage, which iudgment and discretion will induce you thereunto, and the helpe of the Rules following.

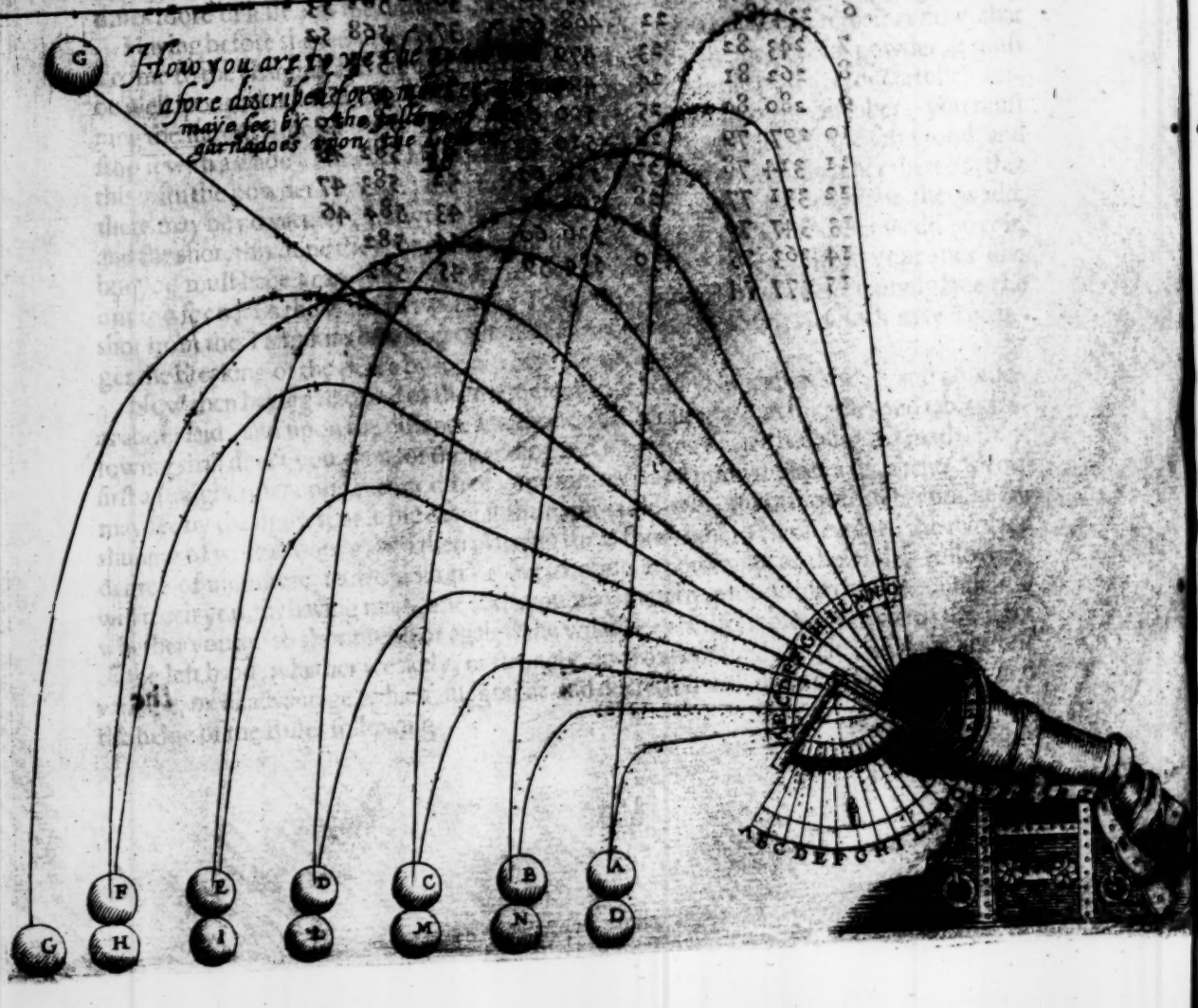
Now

Now wee will come to the use of a morter, and that in this example following, Suppose an Enemy be approached to the *Basis*, or foot of a wall, or a Bulwark, and there is a rooting, and begins to make a mine, and having chambred his powder, intends to blow it up, and that there is no other meanes left you, to repulse, and hinder their egresse and regresse into it: but by shooting out of your morters some Granadoes fireballs, stones and rubish among them, or at least by casting many hand-granadoes down upon them. To do this either by force or policy, it behoveth a good canonier, or fire-worker, to know first (as hath bin taught) how far his morter will carry a granado, or any solid thing else, which shalbe shot out of it, being set upon such and such a degree & elevation as the morter figure will show you. As for example, takey our aime levell with the mould or mouth of your morter, noted A upon the quadrant, and it will carry 200 paces, where you see the granado fals upon the letter A. but your morter being elevated to the mark B it then will carry its bullet 487 paces, if to the second C, then 755 paces, if to the third D, it will carry 937 paces, if to the fourth E, then 1065 paces, if to the fifth elevation F, then 1132 paces, if to the sixth *G*, which is in the midst of the quadrant, and lies then upon its highest elevation it will carry 1170 paces, as you may see by the severall fals of the bullets upon every letter. The second figure showes you a morter casting a granado upon a Castle, as you may see by the example.

Another table of *Diego Vffanos* for Morter peeces, with their Randoms, made for every degree, betweene the levell, and 90 degrees, as followeth.

Degr.	Pac.	Deg,	Deg.	Pac.	Deg.	Deg.	Paces	Deg.
0	100	89	16	392	73	31	539	58
1	122	88	17	406	72	33	543	57
2	143	87	18	419	71	34	549	56
3	364	86	19	432	70	34	552	55
4	285	85	20	445	69	35	558	54
5	204	84	21	457	68	36	562	53
6	224	83	22	468	67	37	568	52
7	243	82	23	479	66	38	573	51
8	262	81	24	490	65	39	477	50
9	280	80	25	500	64	40	580	49
10	297	79	26	510	63	41	582	48
11	314	78	27	518	62	42	583	47
12	331	77	28	524	61	43	584	46
13	347	76	29	526	60	44	582	
14	363	75	30	534	59	45	582	
15	377	74						


A Morter shooting


G
How you are to use the
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TREATING OF COMPOSITIONS, MIXTURES AND INGREDIENCES FOR THE MAKING OF YOVR Concaue, or hollow *GRANADOES*, both great and ſmall, to be shot, or caſt out of a Morter, and alſo of your *HAND-GRANADOES*, to be caſt into a Trench, a Sapp, or the worke of an Enemy.

The Eleventh Chapter.

FIrſt, take three parts of Canon powder well pounded, and ſifted, one third part of Greekiſh pitch, & halfe the weight thereof in brimſtone, mingle theſe two lightly together, and then add to them a half part of ordinary ſalt, and afterwards knead them well together, with oyle of linſeed. This done, fill the pipe of a Cain, with ſome of this paſte, and commixture for a tryall of it: if it carryes the flame cleare and faire, and blowes out of the pipe, with an offenſiue force, without cleaving to the pipe, into which it was put, then without all queſtion it is a ſigne and token of the goodneſſe and perfection thereof.

Now to charge a granado for your Morter or Bombard with this mixture, and ingredience: firſt you muſt take a round ſtick, to turn them about withall, of the bignes that it may go iuſt into the touch-hole of your granado, which you are to charge by reaching down to the very bottome of it, and giue it a ſtamp or two with the ſaid ſtick, continuing ſo, filling and ſtamping it, untill you haue filled up the concaue of your granado up to the touch-hole of it within three or foure fingers breadth, then put into the pipe, or hole of your granado, an artificiall match, and fill it up round about the match, with the aforeſaid Ingrediences even up to the very top of it, which you may do with your finger, without the help of the ſtick, becauſe the match will ſtand bolt upright in the hole, and in the very midſt of it. Laſtly take a peece of courſe linnen cloath and ſmeare it over with pitch and waxe well melted together, and lay it over the mouth of your touch-hole, in ſuch ſort, that the upper end of your match may peepe up a little through a ſmall hole, made in your cloth, and then you muſt bind it hard about, by making your cloth faſt to the mouth of the Morter.

There are divers other receits, both for the making of your Compoſitions, for great and ſmall Granadoes, much differing one from the other, but of all others, this aboue is of excellent vſe, and therefore it is needleſſe for me to ſpend more time in the further ſearch and diſcription of them: onely remember this for a generall rule, that in all compoſitions, mixtures, and ingrediences, they muſt all be well dryed, pounſed, and pulverized, but for your great morters, it will ſuffice if they be lightly broken, the fall, breaking, and operation of them, are able to teare, rend, and breake downe houſes in peeces. The figures of the granadoes are marked A B C vnder the Morter figure.

The ſame ingrediences will ſerue alſo for your hand-granadoes if they be finely dryed, pounced and pulverized, as is aboue-ſaid, and thus much for your Bombards Morters and granadoes both great and ſmall.

TREATING OF A PETTARD, WHICH IS A KIND OF A short peece of Ordnance, deuiſed of late yeares, for the blowing open of Gates, Ports and breaking down of draw-bridges, Their making, uſe, and manner of charging are here diſcribed.

The eleventh Chapter.

THE Modell or forme of a pettard, repreſented unto you in the next plate and figure, is not much unlike to a Grocers, or an Apothecaries Spice-morter, and ſome are tapred much like a Coopers payle, little deeper then the Dyamiter of their mouthes but being not aboue ½ in dyamitre at their bottome, or breech of their mouthes calibre, and in thickneſſe of mettell ½ of the Dyamitre at their breech, and leſſening by degrees in thicknes towards their mouthes, Their magnitudes are ſome to hold but one pound of powder, or leſſe, and others to hold 50 pound or more, and they vſually allow foure pound of braſſe, or fiue pound of yron, to caſt a pettard for one pound of powder, and two hundred 50 pound of braſſe, or 3 hundred pound for a pettard that ſhall hold fifty pound of powder, uſing thoſe proportions diminished for leſſer, and augmented for greater, as Mr Norton in his practize of Artillery deſcribeth.

The demonſtration thereof out of Diego Vffano.

Being maſſie and heavie (whereof the figure A is the mouth, B the breech neere the touch-hole) it muſt be carried upon a thick-board or planck, marked E E, and then layd upon a Karr noted C D, which ſerues not only for the uſe of it, but alſo to raiſe it, when you are to hang and faſten it upon a Port. This planchier in the midſt, hath a round hole in it marked H, through which the noſe, or mouth of your pettard is enchaſed. Aboue it there are two yron rings to hang it on to two Crochets marked G ſcrewed faſt into the port marked A with a match to giue fire unto it. A A are the Bungs, or tampkins wherewith the mouth of the Pettard is bunged up or ſtopped.

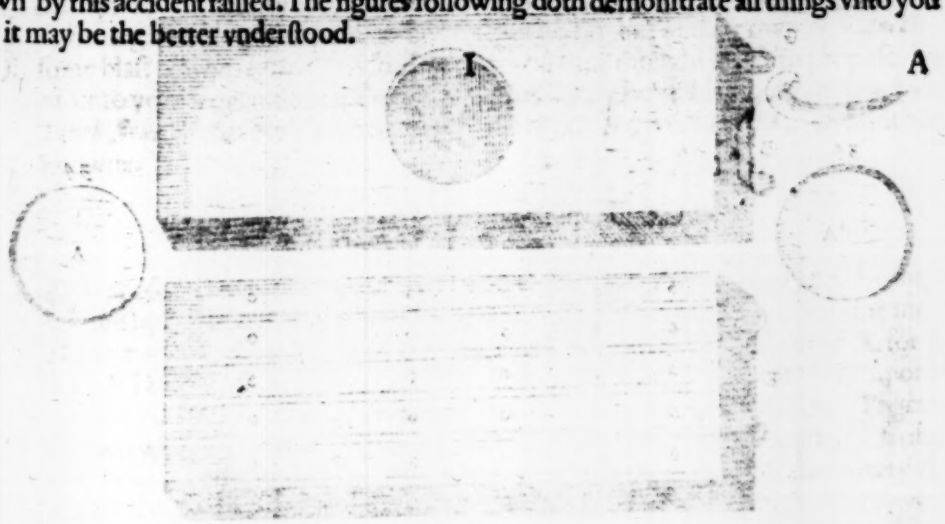
The outſide on which the planchier is enchaſed being three inches thicke is even and plaine, armed with ſtrong plates of yron to defend it from ſplitting: it is alſo to be underpropped with the forked reſt, and ſtayed in the ground at the hinder end to keepe it from recoyling.

When you charge your pettard, you put a round ſtick into the very midſt of the mouth of it down to the bottome, about the length of halfe a cube and ſome two fingers in circumference, & put no more into it at a time, then the better part of a pound of fine corne powder, and ſo fill it litle and litle, ſtamping it well in, round about the ſaid ſtick, with yron drifts or wodden ſtampers within the concaue of the Pettard, vntill it be filled within one fingers breadth of the top and haue its due charge, then turne your ſtick in the midſt about draw it out gently and fill up the hole out of which you draw the ſticke with fine powder that when you are to giue fire at the touch-hole, the whole charge within may be fired in the twinckling of an eye, And having thus giuen it the full charge, then ſtop the mouth of it cloſſe with the bung or tampkin noted A, which muſt be of the thickneſſe of your litle finger, and laſtly couer the mouth thereof with a thick waxed cloath, and power melted waxe vpon it ſome two fingers thick aboue the tampkin, & thus much for the charging of a pettard.

Now

Now we come to the faſtning and hanging it on a Gate, to do this well, you muſt firſt ſcrue in faſt into the gate the Crochets marked *G*, & make choice as neer as you can of the weakeſt place of the *Gate* or *Port*, where it may eaſilieſt be broken open, upon this hang your *Planchier* and put the mouth of your *Pettard* through the hole of the *Planchier* aboue mentioned, then faſten it firmly to the port. There is alſo a third ring or a crochet, & the eare of your Pettard through which you put a roape to binde your pettard faſt to the Port.

And being thus faſtened, and hung vpon a port, nothing remaines then, but to giue fire to it, but your Pettardier muſt haue a ſingular care, that he orders his match ſo, within the Touch hole, that it giues not fire too ſoone, but that he and the men which helpe him may haue leaſure and time to come of with ſafety, before the pettard burſt open the gate, leaſt any be miſcheived with the violence of the breaking of this diabolicall Ingine, which hauing taken its operation, and the gate flying open, your men muſt preſently enter, but one Caviat I muſt giue you by the way that while they are a faſtning and hanging on your petard, to the gate, you muſt haue a ſpeciall care, to look to the perculles, that it be well vnderproped to keep it from falling, for I my ſelfe was once vpon a peece of ſervice at *Venlo*, that yeere as the *Marquis Spinola* took in *Rhen-berg*, & hauing burſt open one gate of the town the *Petardier*, hanging his pettard vpon a ſecond gate, a woman throwing a great ſtone down from the top of the wall feld the pettardier while he was a doing his buſineſſe, which gaue the enemy ſo much time that they knocked down their percullis, and ſo catched ſome 30 of *Mounſeur Chaſtilons* Company between the laſt gate & the percullis who firſt ſhould haue entred the Towne, and being maſſacred, and taken priſonners the ſurpriſing of that Town by this accident failled. The figures following doth demonſtrate all things vnto you that it may be the better vnderſtood.



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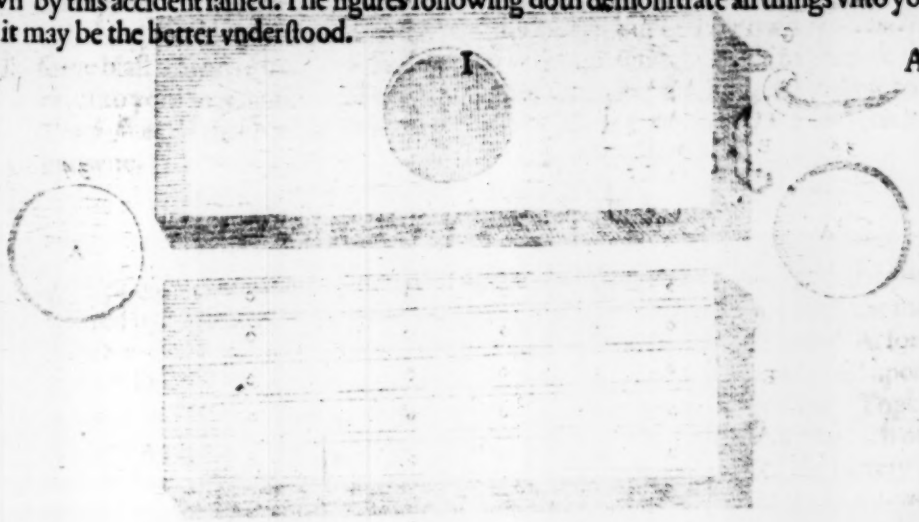
Now

Now we come to the faſtning and hanging it on a Gate, to do this well, you muſt firſt ſcrue in faſt into the gate the Crochets marked *G*, & make choice as neer as you can of the weakeſt place of the *Gate* or *Port*, where it may eaſilieſt be broken open, upon this hang your *Planchier* and put the mouth of your *Pettard* through the hole of the *Planchier* aboue mentioned, then faſten it firmly to the port. There is alſo a third ring or a crochet, & the eare of your Pettard through which you put a roape to binde your pettard faſt to the Port.

And being thus faſtened, and hung vpon a port, nothing remaines then, but to giue fire to it, but your Pettardier muſt haue a ſingular care, that he orders his match ſo, within the Touch hole, that it giues not fire too ſoone, but that he and the men which helpe him may haue leaſure and time to come of with ſafety, before the pettard burſt open the gate, leaſt any be miſcheived with the violence of the breaking of this diabolicall Ingine, which hauing taken its operation, and the gate flying open, your men muſt preſently enter, but one Caviat I muſt giue you by the way that while they are a faſtning and hanging on your pettard, to the gate, you muſt haue a ſpeciall care, to look to the percullies, that it be well vnderproped to keep it from falling, for I my ſelfe was once vpon a peece of ſervice at *Venlo*, that yeere as the *Marquis Spinola* took in *Rhen-berg*, & hauing burſt open one gate of the town the *Petardier*, hanging his pettard vpon a ſecond gate, a woman throwing a great ſtone down from the top of the wall feld the pettardier while he was a doing his buſineſſe, which gaue the enemy ſo much time that they knocked down their percullis, and ſo catched ſome 30 of *Mounſeur Chaſtilons* Company between the laſt gate & the percullis who firſt should haue entred the Towne, and being maſſacred, and taken priſonners the ſurpriſing of that Town by this accident failled. The figures following doth demonſtrate all things vnto you that it may be the better vnderſtood.



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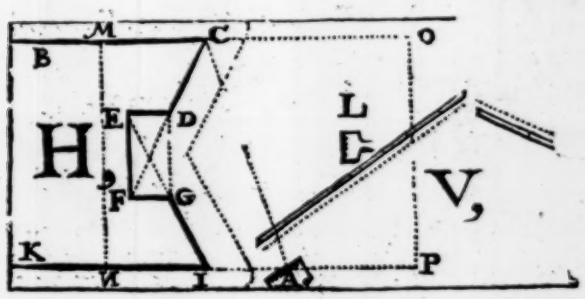
A

QVESTION PROPOVNDED TO THE BATAVIAN INGINIERS
By Maſter JOHN BAPTISTA Mathematician of ANTWERP
For the battering of a HORNE-WORKE.
According to the Proverb.
Let skill appeare by good Demonſtration.

AND
Diſſolved, and Reſolved by that famous Mathematian Maſter
JOHN STAMPION of the Hagh in Holland.



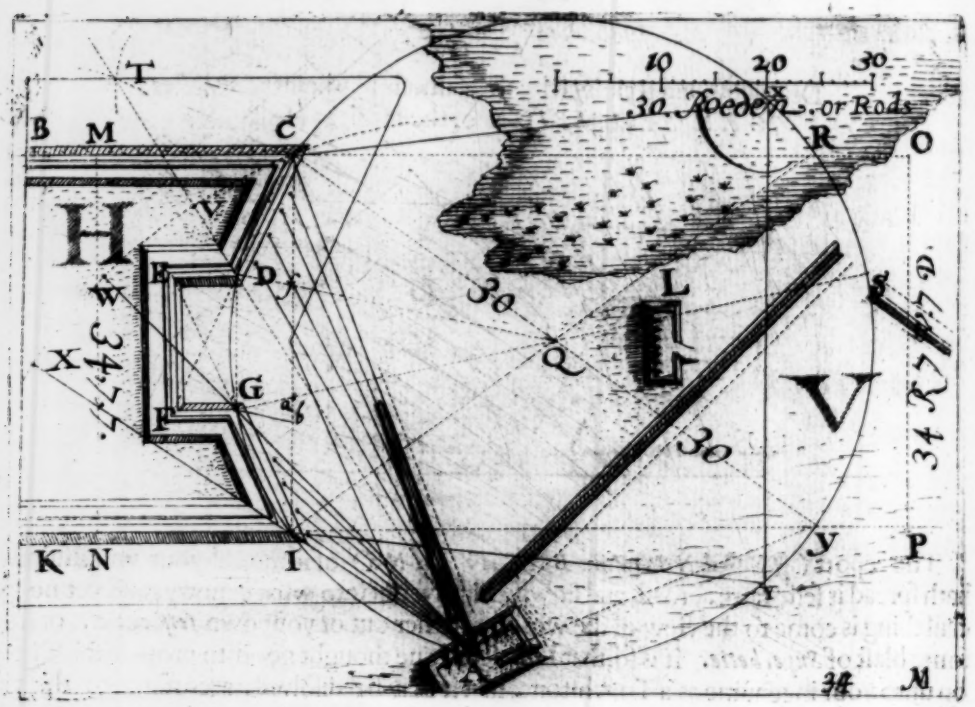
The report (*INGENIOVS BATAVIANS*) of ſome of your vnskilfulneſſe, hath ſpread it ſelfe farre abroad, and flowne I know not into what country, and yet no ſpeciall thing is come to the view of the world, whether out of your own *ſelf-conceit*, or from ſome blaſt of *Superbetie*. It is ſo, that I my ſelfe haue thought good, to propoſe this Queſtion unto your ingenuitie as a Touchſtone, that it may be diſſolved, according to the true *Touch-ſtone* of that Noble Science of the *MATHEMATICKS* by which it may be knowne.

The Propoſition is this.

SVppoſe a Generall, having approached to a certain *Horne-work*, which is here decyfred by the Letter H, and hath come with his line (or ſapp) neere unto the moat of this *Horne-work*, and there deſires to caſt up a royall battery in the place noted A, for to flanck upon E D and D C, in ſuch ſort, that the force of the Canon may beat aſwell upon the *Face* as upon the Flanck, to wit, (*Proportio Equalis*) by an equall proportion. Together, that the two wings C D and G J, and the diſtance G D, which are all alike to each other, may be flancked with the lines and blowes, yet ſo, as the diſtance of the battery A, to the point C be no more then 60 rodd, or 600 foote, and the bredth of the Horn-work to be as M N or O P and being meaſured is found to be 34 Rodd 7 foote and 7 inches. The queſtion is how this muſt be wrought.

Moreover of the ſame Horn-worke the Face is as much as the two greateſt valuation of 1*a* ther*a* 1 *aaaaaaaaa*, 875 *aaaaa*. 3470 *aaaa*, 20640 *aa*. 104040 *a*. are alike to 5 *aaaaaaaa* 1147 *aaaaaaa* 28182 *aaa* 118800, & the diſtance AC no further then 900 foot O *A* and the reſt of the conditions as abouesaid. The queſtion is to find out the bredth of the Horne-worke and alſo the other parts as is aboue ſaid.

THE MATHEMATICALL DESSOLVTION VPON THIS Antwerpian queſtion, Dedicated to all the Lovers of that noble Science, by Maſter *John Stampion* de Jonge Mathematician.



Sirs The wing of Fame hath of late nuttered out, That now our ingenuity is brought to the tryall of the Touchſtone by propoſing of a certain queſtion under the name of Senor *John Baptiſta* of Antwerp, whoſe pate is ſwolne with ſelfe conceitedneſſe and pride, which being not worthy the anſwering, I wil come to the Solution of it, rather to giue ſatisfaction to our Batavians, then to fulfill the deſire of the Propounder. And this may ſerue as an introduction unto it; to the end, that the honor, which he doth aſſume unto himſelfe, may not wholy be appropriated unto himſelf.

The Deſſolution.

Let this figure aboue of a Hornework (as he ſaith) be decyfered by H, whoſe bredth M N is known to be 34 Rods, 7 foot, and 7 inches, & the required battery noted A, whoſe place is likewiſe found out by the known conditions. The firſt condition is, that the violence of the Canon planted upon the battery A, beates with as much force upon the flanck E D, as it doth upon the face C D, whence it is manifeſt, that the angle of the *eſpaule*, or shoulder E D C, being devided into two equal parts with the right line T V D A, that then this battery of neceſſity muſt come to be in the right line T D A. Secondly that the face D C, & J G, and the diſtance D G, may with the like Canon shott be flancked and beaten upon from the batterie A, that is, when as the Angles I A G, G A D, D A C, are alike one to the other, whence will follow, that through the fiue points C D G I and A, a circular circumference will paſſe. Now for that which concernes the third known part, namly as that the battery A muſt be no further from C then ſixty rodd, or ſixe hundred foote, a being the greateſt diſtance in the circumference as is in the third book and 15 propoſition which is taken from of the middle-line of Euclids propoſitions, we haue found out accor

ding

ding to this preparation, the middleline as C Y to be sixty rodds, the right-line C J to bee 34 rodds 7 foote & 7 inches. or 34 $\frac{7}{12}$ and the lines J G, GD, & D C, to be answerable one to another. Let G. now be the *Center*, then substract I G. and Q D cutting through C I in a, and f, then will J a or I C be alike to one of the lines I G &c: because now Q I stands alike to I *G* as I G, is alike to G a and by the 4th proposition of the 6th book, as Q a is alike to a f, so also Q G is to *G* D, or as I *G* is to *G* A the *cube* vpon I *G*, with the *corps* which is made upon the quadrate I Q, as *superficies*, & the depth I C are together alike the corps, which is made upon the quadrate I Q as *superficies*, and the depth I C are togethere alike to the corps vpon the quadrate I Q, as *superficies*, and the depth to be three times the length of I *G*. Whence will follow, aswell by the corporall cutting of a dye, as we haue shown in our new *Algebra* which shall shortly *God* willing come out in English as by *Sectione Com.* by which I G is found to make 28 $\frac{1}{2}$ $-\sqrt{263\frac{1}{4}}$ so doth EF, or D C likewise, and lastly the *angle* E D C, being devided into two equall parts by the preceedent T D then you haue the cutting of A, in the circumference out of Q, where your battery is to be cast up.

Now whereas Mr *Stampion* hath not expressed the finding out of the Face G.I. by reason of the little space contained therin; the more because he hath fully shown the desolution therof in his New *Algebra*, we will here demonstrate the whole working thereof, how the face G I by his new *Algebra* annexed here unto is to be found out.

The operation.

Setting downe for G J. x so comes xxx + 3 1 2 9 3 alike to 2700 x, or xxx—2700 x like to—31293. which is an equality in the third case of the Algebra of Mr Iohn Stampion, which being changed by the second case comes to be xxx—2700 x as 3129 is alike. out of this vacant number 31293 is extracted a Cubice-roote, 2700 tmes, the side as Mr Stampion teacheth in his New Algebra pag. 112 & 113 comes the valuation of x 57 whereof the whole working shall here be set down as followeth.

The finding of the first letter.

4		5.	2700.
3 x | x 9 x	57.	5.	5.
x 0 0 0 0		25.	13500.
4 x 0 x 9 x		5.	
		125.	
		13500.	
		—1000.	The first Substraction.

The finding out of the second letters

5 —— 25
3 3
15 75
2700
343 49 4800
7 the second letter.

135 33600
60 735
705 41343
41293 the last Substraction.

4193
4800 [7
the devider.

This 57 is now the valuation of x, as xxx 2700 x is like to 31 2 9 3 for the same value the signe — set down commeth 57, for the least valuation of the equality then in xxx—2700 x is alike to 31293. Now to find out by this 57 the length of the face GI, as followeth in the Rule fol 138 of his new Algebra, that is, taking the half of 57, which is $28\frac{1}{2}$ and multiply the same quadrate, and the product will be $812\frac{1}{4}$, whose tripple is $2436\frac{3}{4}$ which being substracted out of 2700, the number x remaines $263\frac{1}{4}$ whose square root is $\sqrt{263}$ which being deducted from the halfe of 57, as being $28\frac{1}{2}$ there remaines $28\frac{1}{2} - \sqrt{263}$ for the length of the face G I, and E F, & D C doth as much also.

obserue the manner of the operation.

47
$_2$]$28\frac{1}{2}$
28
$224\frac{1}{2}$
56
28
$812\frac{1}{4}$
3
$2436\frac{3}{4}$

2700
2336
263

comes to be 28—263 for G I.

CHAPTER IX.

Generall. HAving brought your Approaches neere unto a Towre, or a Fortreſſe, whether would you chooſe a Bulwarke or a Curtaine to be battered with your Ordnance?

Captaine. A Towne may be aſſaulted in divers places, ſometimes you aſſault one ſide, when as you make your Batterie on an other, Sometimes you chooſe a Bulwarke, otherwhiles a Curtaine to be battered, with this intention, to take in the Towne, aſſoone as poſſible may bee. As for mee, if I were to take in a great Towne which is populous, I had rather chooſe to batter a *Curtaine*, then a *Bulwarke*, which hath a high catt, or mount upon it: eſpecially, ſeeing that in great Townes the Bulwarkes lying one far from an other, they doe show the skirt of the Curtaine very open.

Gene. Why would you rather chooſe a Curtaine then a Bulwarke?

Capt. Becauſe your Bulwarkes are alwaies ſtronger, and better fortified then your Curtaine, and being as it is the principall ſtrength of a place, and better furniſhed with platformes, flancks, &c. will require more time, labour, and charge to batter then your Curtaine.

Gen. But what Generall is ſo ill experienced, as to labour to batter a Curtaine, having two ſtrong Bulwarkes on both ſides of him, to flanker him when hee is to put over his Gallerie, and to giue an aſſault upon the Curtaine: peradventure for his labour and paines, hee may bee well beaten.

Capt. Soft (Good Sir,) Suppoſe that after a great deale of labour and paines you haue battered a Bulwarke, and falling up to the breach to aſſault it, you finde it cut off, and an Enemy lodged in it, muſt you not then beginne to ſap forward againe, to make a new batterie, whereas on a Curtaine there is not that meanes of cutting it off, as upon a large Bulwarke.

Gen. Haue you ever ſeene the experience of it?

Capt. Yes Sir, the Prince of Orange tooke in the Boſch *by a Bulwarke, and alſo* Breda, *but* Maſtrick *was taken in by making a breach, and ſpringing of a mine, upon the Curtaine betweene Zonger Tort and a bulwarke*, howſoever the Towne of *Cortes* upon the frontiers of France, was firſt battered by the *Arch-duke of Auſtria* upon the point of a Bulwarke, neere unto the very ioynt of the Curtaine, where a high, and a ſtrong turret ſtood, which did annoy us much, ſo that we could not advance forward, but were conſtrayned to leaue off our approach on that ſide, and began to make a new Batterie for a breach in a Curtaine on the Feild-ſide, where there lay a ſtrong Bulwarke to defend it which did our men a great deale of harme, but howſoever with great difficulty and much adoe, wee tooke in the Towne that way, by lodging our ſelues in the Curtaine. Likewiſe the city of *Cambray* was battered, and taken in upon a Curtaine, for all there were two ſtrong Bulwarks that flankered it, which if wee had runne our line upon a Bulwarke, we should not haue forced it ſo ſoone, yea ſuch an occaſion might preſent it ſelfe, that a Generall may be forced to batter both the one and the other, or to finde out ſome ſecret way by undermining a wall, and blowing it up with powder.

Gen. This is for your great Townes, but what ſay you to a Caſtle, a Cattadel, or ſome narrow Fortreſſe, how will you goe to worke to take in thoſe with the beſt advantage.

Capt. As for your Forts, and Caſtles, it is much better to batter them upon a mount or a Bulwarke, then upon a Curtaine: my reaſon is this, that in theſe your Bulwarkes lying cloſe one by an other, will flanke one an other with the greater force, and hide the Curtaine much better too defend it, ſo that one cannot ſo eaſily force it, if the ſaid defenſes be not taken away.

Gen. Goe to then; a Towne then being to be battered, either upon a Curtaine or a Bulwark how many peeces of Ordnance would you haue to doe it, and, how and in what manner would you place, and plant your Ordnance upon your batteries to make a good breach?

Capt. To effect this, I would haue 18 peeces of canon and halfe canon, (*for leſſer peeces for batterie are now growne out of uſe*).

Gen. Whether would you chooſe more whole canon or halfe canon?

Capt. To batter a place well either upon a ſtony or a Earthy wall, you may aſſure your ſelfe,

the more whole canon you haue, the greater and the more ſufficient your breach will be: for your great battering peeces doe ſpoile, and beate downe any thing, which doth meete with their great force and violence: *howſoever of late yeares experience hath taught at divers ſeiges, that your halfe Canon which are more portable, having good ſtore of them, will doe the buſineſſe aſwell as your whole canon.*

Gen. But at what diſtance would you make your batteries, for theſe 18 peeces of Canon, and how neere unto the place, which you intend to batter.

Capt. I would counſell a Generall to approach as neere unto that place as poſſible may bee, and make his batteries ſome two or three hundred paces one from an other, and that if it were poſſible to advance covertly the Approch and ſap, even up to the Counter-ſcharfe, and very brinke of the moate, to prepare a way for his Gallerie: not onely to batter that place being at hand with the greater force, but alſo to keepe in, and hinder an Enemie from Sallying out upon the beſeigers, to diſcover and diſmount their Ordnance in *Caſemates*, or if they haue ſunke any in their walles or Falſe-bray, and ſo to terrifie them, that they dare not ſtirre out.

Gen. I am alſo of your opinion, and hold it for good, yet I feare this will not be ſo ſoon done, and is ſooner ſpoken, then executed, and that before you can bring your approach and ſapp ſo far it will coſt you warme blood, and a great many mens liues, if you haue a ſtout Enemie within to deale withall, and one that is very Vigilant, and carefull to ſtand upon his Guard, and his defence.

Capt. T'is true, this cannot bee done without danger, and the loſſe of men, but hee that is fearefull muſt ſtay at home, and not come into the warres where there is neither place nor time, which doth free or exempt him from danger: yet the danger is not alwaies ſo great, eſpecially in ſuch places, where you haue Earth enough to worke with, to caſt up your ſapps, and to heighthen and deepen your Approaches, which will show you the way, for the more higher you finde the ground in Approching to the edge of the moate, the deeper trenches you may make and cover your ſelfe by caſting up of blinds continually, to keepe you from the ſight of the beſieged, and it is better when you haue brought your approach as it were under them, then if you were 200 or 300 paces diſtant from them.

Gene. I pray you Good Sir, how would you plant, and devide theſe 18 peeces of Canon?

Capt. I would make a great batterie with 8 of them to beate upon a right line, either upon a Curtaine or the point of a Bulwarke (which the Generall ſhall finde fitteſt) Two batteries with each 3 Canon to play ſlope-wiſe from the great batterie as the ninth plate and 28 & 29 figures showes, and two batteries, with two halfe Canon a peece to play, as it were croſſ-wiſe upon the breach, and thus you ſee your 18 peeces planted upon 5 bateries, as you may obſerue in the 9th plate and the two figures of a Curtaine and of a Bulwarke following.

Gen Good Sir tell mee I pray you how many ſhot will theſe 18 peeces of Canon make in 10 howers, and how much powder will they require.

Capt. In 10 howres they may make ſome 1500 ſhott, and will require a matter of 25000 pound weight of powder, that is 150 barrels full, each barrell contayning 160 pound weight in it.

Gen. You make your account then that every peece in the ſpace of 10 howers is to ſhoot 80 ſhot, that is 8 ſhot an hower for every peece.

Capt. You may make 10 ſhot in an howre if you pleaſe, if your peeces be renforced, but as for your ordinary peeces, they haue not mettailline ſubſtance enough to beare it: conſidering alſo that after you haue made 40 ſhot out of a peece, it will be ſo heated, that it muſt haue a cooling time, which muſt bee at leaſt an hower, for otherwiſe your peece being growne over hot, it may cauſe danger.

Gen. Me thinkes that 80 ſhot for a peece in ſo long a time were too little, having often heard, that in that while, a peece may well be ſhot of 130 times, can you giue me your reſolution upon this?

Capt. I will tell you Sir what hapned once in the Iland of *Bomble* Anno 1599. wee planted a peece by a mill, by which wee did annoy the Enemie very much, ſo that they were forced to make

make a battery, and planted a whole Canon and a demy-Canon upon it, ſeeking to diſmount ours. Now ſhooting with this peece from foure of the clock in the morning, till eleven toward noone, this peece had a cooling time the ſpace of two howers, and about one of the clock, wee began to play with it againe, and continued ſhooting with it till 4 a clock in the afternoone: but this peece being not able to endure the force and heating of ſo many ſhot, wee were conſtrayned to leaue off with it: and yet ceaſed not ſhooting with our other peeces from an other batterie by commaund from *Don Lewes de Valaſco* Generall of our Ordnance, and ſhooting croſwiſe with ſome other of our peeces, wee put the Enemies two peeces to ſilence in the ſpace of an hower, a Souldier of ours ſtanding by, was curious to keepe a taily of the number of all the ſhot we made from the morning till foure a clock in the afternoone, and showed mee 80 notches, which deducting the two howers cooling, our peece planted at the mill made 8 shot in an hower, which was as much as could be required of it.

Senior Diego Vffano *giue your Tranſlatour leaue to interrupt you a little, and ſo to conclude this diſcourſe. If you remember at the ſeige of Oſtend which you mention often in your Chapters and dialognes, you were without, and I was within the Towne, that on the ſeventh of January Anno* 1602. *Stilo Novo, After Sir* Francis Vere *of famous memory (who defended and kept the Towne againſt you) had deluded you with a* Parley, *onely to gaine time, and to make up our Canon and Sea-beaten workes, along the skirt of the old Towne, his highneſſe the Archduke reſolved to aſſault us, and that morning begann to batter* Sand-hill *and* Schotenburgh, *to make a breach for you againſt that night, with intent to Aſſault us (as you did) and to haue entred the Towne, and haue put us all to the ſword, the Relation whereof you ſhall heare in the end of this booke. Now you had placed and planted your* 20 *peeces of Canon to batter them in this manner,* 8 *from your batterie at the foote of the* downes, 8 *from a batterie on the right hand of the downes,* 6 *from your pile batterie,* 6 *more which you had made upon the ſand, and as it were raiſed out of the ſea: the firſt shot upon the breach in a right line, and the other* 2 *ſlopewiſe, as your two figures following doe demonſtrate. Theſe* 20 *peeces of Canon towards noone had a cooling time, for a matter of ſome* 2 *howers, iuſt as you haue ſaid, and afterward you began to batter the breach and old Towne againe, till it was almoſt twilight, and then they cooled againe, till you were readie to giue us an aſſault, and before you fell on as I doe well remember, you shot of one of your Canons with a hollow bullet which flew over the Towne and made a great humming noiſe, as a warning peece to the* Count of Bucquoy, *who lay on the Eaſt ſide, that you were then readie to fall on, and that he should doe the like, this was your Signall. Now* Generall Vere *knowing well your intent, gaue order to the Gentleman of our Ordnance who had the guard upon* Sandhill, *that hee should keepe a true* taily *and an account of all the shot you made that day, with your* 20 *peeces of Canon upon the breach & the old Towne, which being caſt up, there were found to be made that day from morning till night* 2200 *shot, which was found to be an* 110 *shot for every peece, &* 11 *shot an houre for every peece, which is more then* 8, *but I verely beleeue your peeces were renforced.* This by the way, and ſo I returne againe to your owne dialogue.

Gen. (Good Sir) I pray you show mee how you would batter the point of a Bulwarke (as the figure 28 following demonſtrates,) and giue mee ſome reaſons aſwell defenſiue as offenſiue.

Capt. I am willing to giue your Lordship content, and ſay, If I were to batter the point of a *Bulwarke* or a *Baſtion*, I would haue the ſame number of battering Canon, and planted in the ſame forme & manner as they were for the Curtaine and to shoot sloope and croſſewiſe alſo, & if your approaches were advanced ſo farre they should be planted upon the very brinke of the moate and upon the *Counterſcharſe*, I would plant 4 of them ſo, that they should diſmount the Enemies Canon in their *Caſemates*, or any if they had ſunk them in their *Falſebray* which should waite upon that occaſion.

Gen. I am of your mind and preferre ſuch a battery before all others, who are of the opinion that they had rather chooſe a Curtaine then a Bulwarke to be battered.

Capt. You haue heard my reaſons for that, and ſee the figures following traced out to you. But as for your *Bulwark* the *beſieged* may cut it off (as you may mark in the figurs of *retrẽchments* and *Cuttings off* in the ſecond part of this booke) for indeed it will be a hard matter to force an Enemy out of a Bulwark, who is reſolved to looſe it by peecemale and degrees and there is not ſo

much danger in aſſaulting of a *Curtaine*, which being once well battered and beaten downe with your Ordnance, you haue an eaſier way and entrance to fall on with your troupes of men, to enter the Towne, or Fortreſſe, but for the defence which is made from your *Flancking Bulwarkes*, or your *Caſemates*, you muſt make batteries upon the brinke of the moate againſt them, (as is ſaid) to diſmount the Enemies peeces, and to flanker with your Ordnance the *Parapets* of the Bulwarks to beate them about their eares, that the bulwarkes may lie the more open to you, and I thinke this way is the leaſt danger.

Gen. But the Beſieged their cuttings off may they not be made, aſwell upon a *Curtaine* as upon a *Bulwarke*.

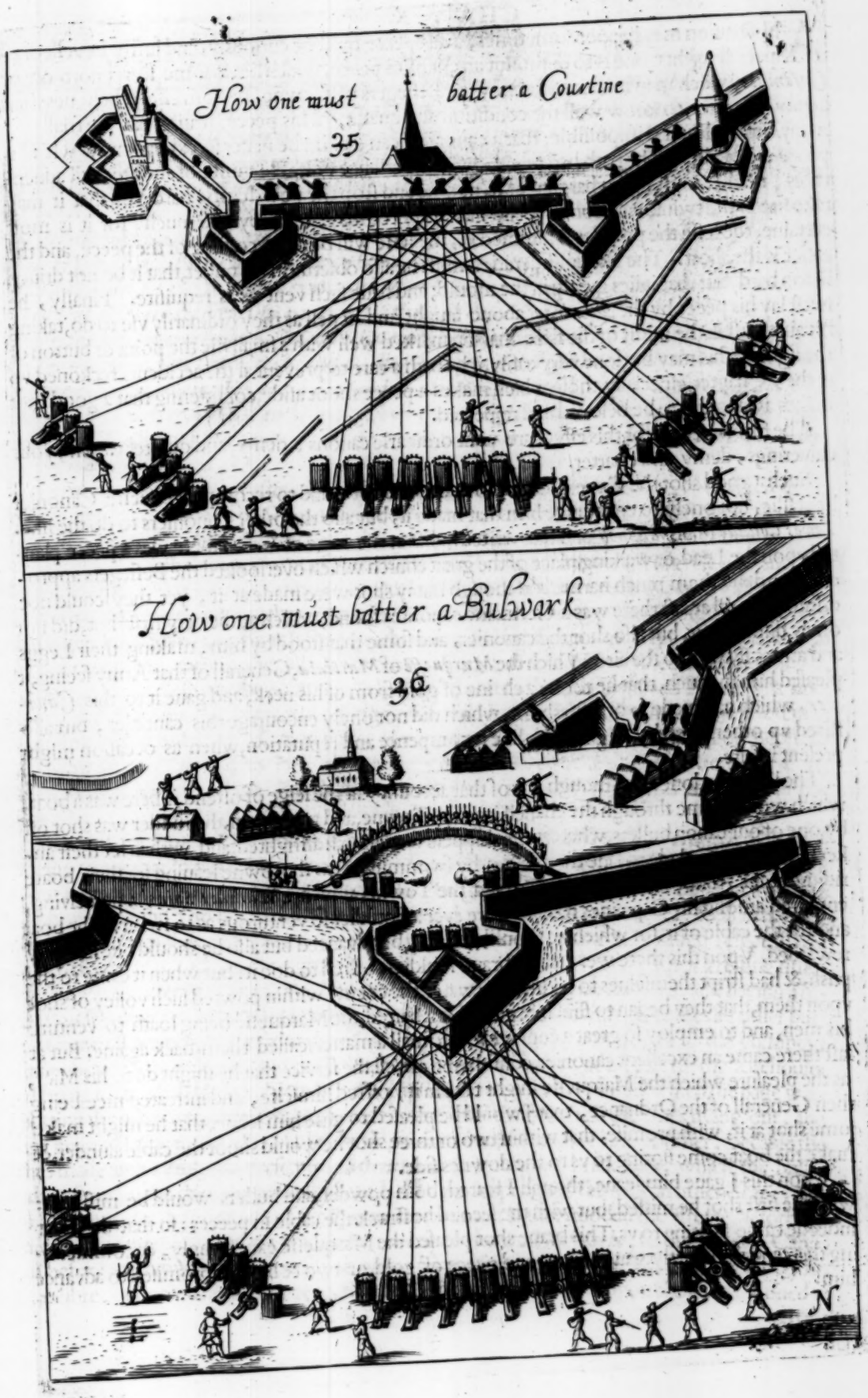
Capt. No, for the *Rampire* being thinner, you haue neither ſo much ground, nor the like accomodation in a *Curtaine* as in a *Bulwarke* and indeed, a Governour of a Towne, or of a Fortreſſe if he were put to his choiſe, had rather to bee aſſaulted on a Bulwarke (then on a Curtaine) by cutting it off into the forme of a halfe moone, that he might make a new reſiſtance, and defend it with a leſſe number of men. Beſides, in a Bulwarke the Beſieged haue this advantage over the *Aſſaillants*, which is very dangerous for them, that they may make a minewithin the bowels of their Bulwark when an enemy ſhall attempt to aſſault it, and thinking to eneer the Breach and take the Towne, they may be blowne up into the Aire by a Countermine, the like alſo may happen to the Beſieged, the *Aſſaillants*, ſpringing their mine alſo in a Bulwarke, when they thinke they ſtand upon their beſt defence.

Gen. May not the like be done alſo in a Curtaine?

Capt. No, it will not takethe like effect as in a Bulwarke, for a Breach being once made in a Curtaine, for as an enemy may aſſault it at large, ſo they may bring a greater number of men to fight, to helpe to defend it, whereas in a Bulwarke they are pend vp and ſtraighted in a narrow place, which may be cut off, and will require a fewer number of men to defend it, whereas thoſe which are to force it, muſt be coſtrained to bring vp a great many mē to aſſault, who in an inſtant may be in danger of blowing vp.

Gen: Your reaſons (Good Captaine) are not to bee ſlighted; but as for me, I hold it ſafer, to batter and aſſault the breach of a Bulwark, then of a Curtaine. For though the beſieged may cut it off, and defend it with a fewer number of men, yet the Aſſaulters haue this advantage over the Beſieged defendants, that they haue more place and elbow roome, and may finde a leſſe reſiſtance then in a Curtaine, ſeeing that one may make as great a breach in a Bulwarke as in a Curtaine: becauſe your Ordnance may beate it flat, and levell with the ground, and chooſing rather a Bulwarke: I will herewith conclude this diſcourſe, and now ſhew you the figures both of the one, and of the other in this plate following.

HOW


How one must batter a Courtine
35
How one must batter a Bulwark
36
N

HOW A CANONIER OVGHT TO GOVERNE himſelfe in making of a good shott.

CHAP. X.

AN Ocaſion may happen ſometimes, that a peece muſt be curiouſly, and iuſtly Levelled; eſpecially, when one is to diſmount an enemies peece, which lies in ſome ſecret porti ole or *Caſemate*, which may hinder and annoy the Beſiegers of a towne, or Fortreſſe. Jt behoues then a good Gunner, to know well the condition and quallity of his peece, hauing had the triall of it many times. For it is impoſſible, that a canonier can let him be neuer ſo expert, know what his peece will do before he hath had practize and experience of it. He muſt not shoote at all aduentures, neither muſt he in charging of it, ramme and ſtop the powder too hard but that it may take fire in the twinkling of an eye, and that his peece may not recoyle to much, for it is moſt certaine, the leſſe the powder is rammed in, the leſſe will be the recoyling of the peece, and the eaſier is the shott. The like conſideration muſt he alſo obſerue in his bullet, that it be not driuen in too hard, but that it lies gently in the mould, and haue ſuch vent as is requiſite. Finally, he muſt lay his peece by the *Quadrant* aboue taught, and Leuell as they ordinarily vſe to do, taking his aime iuſt in the midſt of the frizes, having marked well with a ſmall file the point or button of the ſight, & this may be done very eaſily, if he hath a care to prevent al the accidents reckoned vp in the 9 Chapter; eſpecially, thoſe which makes a peece shoot aſide, conſidering that a good shot makes a Canonier to be beloved and reſpected.

The fitteſt peeces for this effect are your ordinarie canons, demy, and quarter canon, your culverings, demy and quarter.

Such a good shot the General ought to take notice of, and to recompence ſuch a Canonier liberallie, not onely to encourage him that made it, but alſo the other Canoniers to do the like. *Lewes Collade* in his *manuell* practize writeth, that at the ſeige of *Sienna* there was a peece planted vpon the Lead, or walking place of the great church which overlooked the Beſiegers approches, and did them much harme and though many shot were made at it, yet they could not diſmount it till at laſt there was a Germaine canonier found, which at the very firſt shot, did not onely diſmount it, but alſo shot the canonier, and ſome that ſtood by him, making their Leggs and armes fly vp into the aire. Which the *Marqueſſe* of *Martinia*, Generall of that Army ſeeing, it pleaſed him ſo much, that he tooke a chaine of gold from of his neck, and gaue it to this *Canonier*, which had made ſo braue a shoot, which did not onely encourage this canonier, but alſo ſtired vp others thereby to gaine the like recompence and reputation, when as occaſion might preſent it ſelfe.

The like was done alſo (though not of that account) at the ſeige of oſtend, There was a boat, which would come through the chanell into the Towne, and running in, the rudder was shot off by one of our canon bullets, whereat the shippers were much affrighted, and withall let their anker fall, and were glade to ſaue themſelues by ſwimming into the towne leauing ſo their boate riding at an Ankor betweene the dike and the Towne, which *Marques Spinola* perceiving, enquired among his Captaines if there were ever a Souldier ſo venturous as to ſwim to the boat and cut the cable of it, for which he should not only be advanced but alſo he should bee liberally rewarded. Vpon this there were many braue ſouldiers offred to doe it: but when it came to the push, & had ſtript themſelues to go into the water, the enemy within powred ſuch volley of shot vpon them, that they began to flinch & grow faint harted, the Marqueſſe being loath to venture his men, and to employ ſo great a courage for ſo ſmall a matter, called them back againe. But at laſt there came an excellent canonier, conſidering aſwell the ſervice that he might do to his Matie, as the pleaſure which the Marqueſſe might take in it; offred himſelfe, and intreated mee being then Generall of the Ordnance, that J would be pleaſed to giue him leaue, that he might make ſome shot at it, with promiſe, that within two or three shot he would shoot the cable aſunder, & make the boat come floting to vs to the downes ſide.

Vpon this J gaue him leaue, though I feared, both powder, and bullets would be miſſpent: with the firſt shot he miſſed, but with the ſecond he ſtrack the cable in peeces: ſo that the boat indeede came floating to vs. This braue shot pleaſed the Marqueſſe exceedingly, & commending this canonier greatly, gaue him a good peece of gold, or two & beſides promiſed to advance him.

Jt

It is true Senior Diego Vffano, *your Tranſlatour being then page unto Generall Francis Vere, who then commanded within this Towne, was then a ſpectatour of it, and Sir* Francis Vere *and divers Officers which looked on commended alſo your Canonier highly for making ſo braue a ſhot, but I will put you in minde of two or three other, more famous then that. If you remember there lay a whole* Canon *of ours upon the Weſt Bulwarke, which carried a bullet of 48 or 49 pound weight, and as it was a braue peece: ſo had it an excellent Canonier, one* Francis Nelſon *an English man, who ſerved Queen* Elizabeth, *of ever bleſſed memory in the* Brill, *he ſhooting ſo ſure with it, that he diſmounted 2 or 3 of your peeces which were planted upon your high* Catt *upon the downes, for a revenge you did make a batterie of 2 or 3 Canon to diſmount our peece, and one of your Canoniers made ſo good a ſhot, that he ſhot his bullet iuſt into the very bore, or mouth of our Canon, ours being charged, your bullet and ours ſtriking together in our Canon, from that violent blow, flew ſparkes which gaue fire to ſome looſe cornes of powder which were not well driven home, and ſo our peece giving fire to it ſelfe, ſent you back your owne bullet, & ours to accompany it, without breaking or doing any harme to our peece, and this is moſt true for there are ſome Officers yet living that ſaw it.*

The ſecond was this, you had a halfe Canon that endevoured to diſmount one of ours, which alſo ſought to diſmount yours, both Canoniers having levelled their peeces as right as poſſibly they could, and giving fire at an inſtant together your bullet and ours meeting one another in the Aire, with the violence of that encounter, both bullets breaking, the peeces of them flew up as high into the Aire as Pauls *ſteeple. If* Vandermyle *the Controuler of the States Ordnance were alive, he could tell you that this ſtrange ſhot is true, aſwell as I.*

And now you are a diſcourſing, I will truly relate two, or three more unto you which came from your Catt. Some of our Run-wayes could tell you, and ſhow you almoſt in what houſe *Generall Vere* lay in *Oſtend*, and you had a shreud ſpight at him, for ſome daies you haue ſhot, 8 or 9 *Canon ſhot* through the vpper part of his Lodging, and one night amongſt the reſt, having bin the round, for he was very vigilent, and carefull to look to your proceedings, and by all meanes poſſible to hinder your approaches: comming home after Sun riſing, when he knew there was no danger, he went to take his reſt for 3 or 4 howers, and lay downe and ſlept upon his bed in an upper chamber, awaking he called for a cleane ſhirt, and while his footeman was ayring of it before a *Charcoale* fire in the chimney, while one that was then his page was a pulling a ſilke quilted waſ-coate over his eares, and calling for the ſhirt to putt it over his head, his footeman comming with it, iuſt came a Canon bullet of 49 pound weight through a wineſchot Bedſted, iuſt by Sir *Francis Vere* and his *Page*, the Lacquey comming with the ſhirt, ſhot both the ſhirt, and his bowels to paſh, which bloud light and ſprang on him and his page, was not this a narrow eſcape?

After this Sir *Francis Vere* would lie no more in this upper chamber, but remooved his own lodging to another lower roome, howſoever, from your high Catt or mount you could finde us out againe. For a while after Sir *Francis Vere* going every night the Round, and viſiting the Gards without the Towne, to diſcover how you did advance your approaches, & to make you buy that ground full dearely: The Sunne being up came home to take his wonted reſt, till 10 a clock before noon, making the nights the dayes, and part of the day our night, for a reſting time. The ſame page after Sir *Francis Vere* had called for him, came into his chamber, and having a little firkin ſtanding by the hearth, in taking up a few *charre-coale* aſhes into it, comes an other bullet of ſome 48 pound weight from your Catt, ſhootes through the vtmoſt part of the chimney, a little aboue the mantletree, and the bullet having come through a good part of the forehouſe, and being ſomewhat deaded, fals iuſt by the pages eares into the very firkin, which the page was, a putting the aſhes into, brake it, and made a dint upon the hearth, all the aſhes flying out, the page giving a leape toward his Maſters bedd, for wee could ſcarce ſee one another, becauſe the aſhes made ſuch a duſt, and preſently fell downe aboue 20 great brick-bats, which the bullet had looſened in the chimney upon his head, had he not leapt away, this was an other eſcape: But for a revenge the page got one of Sir *Francis Veres* centinels, that ſtood in the ſtreete before his dore, to crue up this bullet in a wheele barrow up to the weſt *Bulwarke*, to the English Canonier before mentioned, and becauſe you write in your former *Dialogue*, that one bullet may fitt the calibree or bore of another peece, this bullet fitted ſo iuſtly our Canon aboue mentioned to

a haire, which was ſent going to you againe, piping hot out of our Canon, to your Catt; and hee made ſo good a ſhot, that I verely beleeue, he ſent ſome of you to *Purgatory*, for wee could diſcover ſome Armes and Legges which flew up into the Aire, and ſo you were payed with your owne coine.

One, or two more and then I haue done. You remember well the 7th of Ianuary, that day which you did batter *Sandhill*, and the skirt of the old Towne, afore mentioned, for all your often shoting, yet there was one halfe Canon lay upon it, not farre from your breach undiſmounted. The ſame page, after he had taken his Levell, gaue fire upon two horſes and a waggon which came riding along the ſtrand from *Albertus Sconce*, towards your *Pile Batterie*, it ſeemes laden with powder or Bullets, he made ſo dire a ſhot, that he ſtrooke his marke, killed one of your horſes, and the Waggon shot a peeces. The Page being overjoyed with this shot, he would needes make an other, and whiles he was a levelling his peece at an other marke, one of your Canoniers turnes a peece aſide from the Pile Batterie, and shootes iuſt in at the very *port-hole* of our halfe Canon, and came ſo right, that it licked off a pound or two of the mettle of the *Muzzle* upon the upper *Frizes* of our halfe Canon, ſome peeces of this mettle killed a Gentleman that ſtood by as a ſpectatour, and shot Sir *John Ogles* Cooke into his belly, which was there likewiſe, but the page which ſtood behind the brich, a levelling the peece with his thumbe, eſcaped, and had no harme, but your bullet flying by his eare made ſuch a humming noiſe in his head, that hee thought there had bin a ſwarme of Bees in it. This I haue written, not for any Oſtentation, but onely to shew you, how miraculouſly (yea even in the greateſt dangers) God can preſerue his ſervants, according to his promiſe: Pſal. 90. verſe 7. *A Thouſand ſhall fall at thy ſide, and ten thouſand at thy right hand, yet it ſhall not come nigh thee.*

One more, and then I will end my digreſſion: At the laſt ſeige of the *Boſch* the yeere we took it in, Anno *1629*. Wee having advanced our Approaches cloſe under your little *Sconce*, a muſketteir of ours, putting the noſe of his musket through the Musket Baskets to giue fire, one of your *Firelockes*, lying upon the *ſnap* for him, gaue fire upon him iuſt at the very ſame inſtant, and shot his firelock bullet right into the very mouth or boore of his musket, ſo that the bullet ſtriking againſt the ſcrue of his brich, burſt open the *touch-hole* of his musket, and a peece of the bullet came out of the ſaid *touch-hole*, while the Prince of *Orange*, Sir *Horace Vere*, Colonell Generall of the English, and diverſe other Officers ſtood by, and thus you ſee how wonderfully it pleaſed God ſometimes to preſerue his creature.

Now I come to you againe, where you exhort all *Maſter-Gunners*, and *Canoniers*, that will ſtudie this Art, that they with great care and diligence practiſe theſe rules abouesaid, for the levelling, ayming, and taking their markes right, remembring, that there is more dexterity, and cunning to be showne in shooting at a ship, ſayling away ſwiftly before the winde, then at a Troupe of Horſe, or Men marching ſoftly upon the Land, or to diſmount a peece planted upon a Tower or a Bulwarke, where you haue an immoveable marke, eſpecially when as you are to shoot upward.

This Art muſt be learned and practiſed, when you haue not much to doe, that when neceſſity cals for your employment, you may then not onely be able to doe your Prince and Countrey ſervice againſt their Enemies, but alſo gaine your ſelfe fame and reputation.

Now hauing treated at large in the former Chapter, how you shall *levell* your peece *point blanck, levell with the mettle* or at a *range*; according to the elavation you giue it. To shut vp all, take this obſervation a long with you, that if the *frizes* of the *muzzell* of your peece, or the button of it be higher then thoſe of the *brich*, then it will carry ouer, Againe, if you take your aime from the *brich* aboue the ſame, and the *button* reſting onely vpon the thickneſſe of the *Mettaline-ſubſtance*, your bullet will alwaies fall short. But if your *frizes*, be alike, aſwell at the muzzle as at your brich, then you shall be ſure to shoot levell with the mettell of your peece, & shall not faile to ſtrike the marke you shoote at, if it lies within the termes of the pointes abouesaid.

HOW

HOW AND IN WHAT MANNER A GENERALL OF THE ORDNANCE ought to plant his Canon in a day of Battle, whereby he maye annoy moſt an Ennemy.

Extracted out of the ſecond treatiſe of Don Diego Vffano his fifth Dialogue betweene the Generall of the Ordnance, and a Captaine as followeth.

Generall, Sir, I would faine know of yow, how Ordnance ought to be placed in a day of battle, which might gaule an Ennemie moſt?

Captaine. I make noe queſtion, but your Lordship having had experience in the warres of *Savoy*, & *Hungarie*, can tell better then I am able to ſpeak, and if I ſhould vſe a teadious diſcourſe, it might then ſeeme that the *Scholler* should preſume to teach his *Maſter*.

Gen. Howſoeuer in ſuch a caſe I would willingly take the advise of an old experienced Souldier, and eſpecially of ſuch a one, who hath ſerved in theſe parts. As for mee, I dare not boaſt of any great experience, having had enough to doe to look vnto my owne affaires, neither have I had much leiſure to informe my ſelf well about *Artillerie*. But now ſeing I am to receiue that charge vpon mee, I pray yow tell mee, as a man who hath bin beaten there vnto, & hath had longe experience in the warrs, how they doe vſe to plant Ordnance in theſe quarters.

Capt. Sr, There hath bin but a few battles fought in theſe parts, and to ſpeake truely, I am not able to ſatisfie yow touching this point. Nevertheleſſe, I will tell yow what I haue ſeene in two, wherein I was preſent. In the one the Ordnance was planted in the *head* of the *Battaillons*, and in the other betweene them, two by two, and three by three vpon the flancks, & wings of the Muſkettiers, & blinded with the wings of the *Cavallerie*. But as for mee, I am of the opinion that it is beſt to plant ſome peeces in the *front* of the Armie, which maye play vpon the Ennemies troupes on all ſides: ſeeking out alwaies for this effect, ſome places of avantage to place them in, that yow maye not be in daunger of looſing your peeces. And though you cannot gett ſuch an advantage, yet your peeces being in the head of your *Battle*, will be of leſſe ſervice, becauſe when yow are to come to the *Chock*, and joyning of Battles, they maye in ſome wiſe annoy your owne men, which I ſaw in one of theſe Battles abouesaid.

Gen. Therefore I think it were fitter they should be placed vpon both the *Flancks*, and in the *Reere* of the *Battaillons*, by leaving a free place of Armes, which maye giue noe offence to our owne men.

Capt. I can hardly beleeue (*Illuſtrious* Sr.) that that would be ſoo expedient, for an Ennemie, perceiving that the *Front* is left bare without Ordnance, he would take the more courage to fall on, and come vp to the charge: Therefore, I hold it more fitting, that the *Artillerie*, as yow maye ſee in the Figure S. maye be divided ſome here ſome there, both before the *Front*, and vpon the Flancks, placed ſome 50. or 100. paces one from an other, & then their wil be no danger, when the Ennemie shall come vp to the *Chock*, to encounter yow, or offend our owne men, expecially when they are faſtned to them by drawing Roapes, and yron rings, that vpon an inſtant they maye be remoued & turned for the advantage of our owne troupes, and give fire as faſt as they can charge & diſcharge among the Ennemies troupes, which is a matter of great momẽt for the obtaining of a Victoirie.

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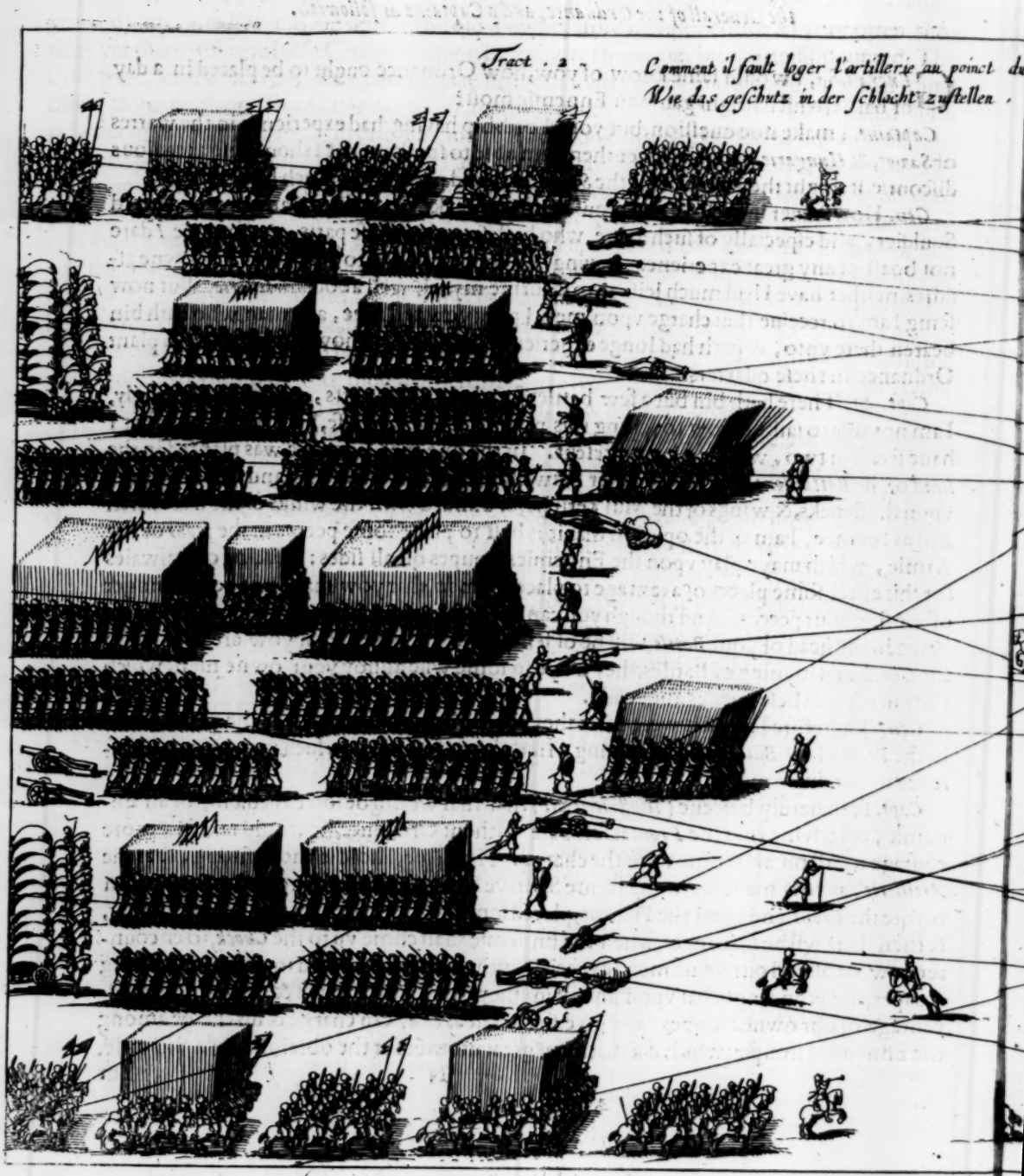

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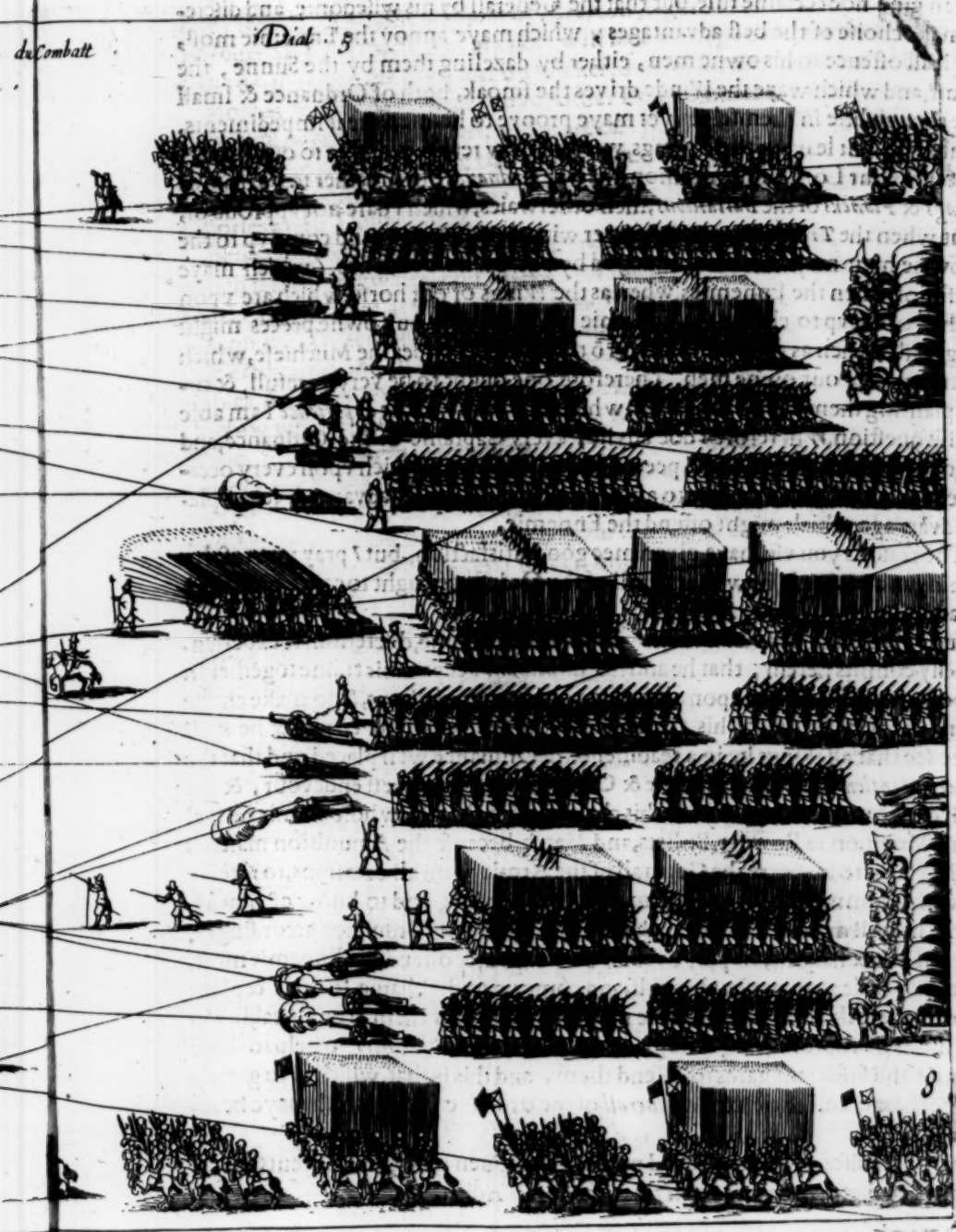


But it happens very seldome, that such convenient places can be found, for the planting of Ordnance in a Battle, as were to be wished, for oftentimes one shalbe driven of necessity, to make choise of such places, as the ground will afford, by reason of *Woods*, *Hils*, *Marrish grounds*, and such like disadvantagions places, as yow maye meet withall, and for which one can giue noe certaine rule, but that the Generall by his wisedome, and discretion, maye make choise of the best advantages, which maye annoy the Ennemie most, and give the least offence to his owne men, either by dazeling them by the Sunne, the arising of Dust, and which waye the *W*inde drives the smoak, both of Ordnance & small shott, which though litle in themselves, yet maye proove to his men great impediments, and disadvantages. But leaving these things, wee wil now returne againe to out former discourse, because your Lo: is of the opinion, that the *Ordnance* ought rather to be planted vpon the *Wings* & *Flancks* of the *Battailions*, then otherwaies, which I dare not approue of, in regard that when the *Troupes* are to encounter with the Ennemie, and come vp to the *Charge*, our owne men maye be more annoyed by our owne Ordnance (which maye breede a coufusion) then the Ennemies, when as the *W*ings of our horse, which are vpon the *Flancks* shall come vp to charge the Ennemie: so that then our owne peeces might pusle them greatly, when as they are to play frō the *Flancks*, besides the Mischiefe, which might happen amonge our owne men. Therefore, one ought to be very carefull, & circumspect in planting them. And this is that, which out of my owne *experience* I am able to say vpon this question. *W*herefore I doe advise, every Captaine of the Ordnance, and Master Gunners, to vse some light feild peeces, and small Drakes, which vpon every occasion maye be remoued from one place to another, and courtegiously advanced, to the places of most advantage, which might offend the Ennemie.

Gen. Sr, The reasons you vse, have given mee good satisfaction, but *I* pray you resolve me of one thing more, that is, how a Generall of the Ordnance ought to cartie himself in the day of Battle.

Capt. In such a time, the *Generall* is to show most his wisedome, discretion, & experience, which chiefly consists herein, that he and his *Lieutenant* keepe their traine together in good order, to have a vigilent eye vpon all accidents, that maye fall out, & to make choise of such ground, for the planting of his Ordnance, as the *Generall* of the Armie & he shall thinke best, to see that all things be in a readinesse, the Ordnance well placed, and that the Master *Gunners*, *Gentlemen* of the Ordnance & Canoniers doe their best endevour, & acquit themselves like men. It is partly also his charge, to see, that the whole Armie be wel provided with Munition, as Powder, Bullets, and Match, because the Amunition marches vnder his traine. He is to be neere the Generall of the Armie vpon all occasions, to receiue his directions, and Commands, & to see them executed speedely, and to know of him after what forme he will make his Battle, that he maye plant his Ordnance accordingly, & so to finde out hils & heigths, to play over his owne men, & offend the Ennemie most. And when an Ennemie shall present himself, and come vp to the charge, to draw & plant his Ordnance, as neere their horse as possible maye be, to hinder them from breaking in vpon the devisions of foote takeing along with him *Saylours* & *Pionniers*, to help to draw vp the *O*rdnance and sufficient gards to defend them, and this is that, which in so great a buysnesse is the charge, and dutie of the *Generall* of the *O*rdnance, and which maye be required of him.

Gen. Captaine, this discourse hath pleased me well, and giuen mee good contentement, and I am glad, that I mett with yow vpon this occasion, Adieu.

THE 10. CHAPTER.

Treating of the diverſe ſorts of Bridges, uſed in the ſeruice of the Lords the States of the Vnited Provinces.

MAny a braue occaſion in the warres hath bin loſt, for want of Bridges to paſſe ouer a River, a Brook, or a Moate: therefore the States for any peece of ſervice, haue alwaies diverſe Bridges in a readineſſe, both ſmall & great. The ſmaller ſort for any ſuddaine enterpriſe, or for putting ouer the Moate of a *Towne*, a *Hornework*, or a *Halfe-Moone* are three, as firſt a *Corke-Bridge* now not in vſe, ſecondly, a *Bullruſh-Bridge*, the peeces whereof are ten foote longe, and ſix or ſeven foote broad, that four men may goe ouer them in *Front* deſcribed vnto you in my ſecond part in the Chapter of *Aproaches*, Figure 159, whereof many peeces being ioyned faſt together with roaps, and anckors, will laye a Bridge ouer a Moate, a Brook, or a Ditch for men to paſſe ouer, the third ſort is a wicker, or a *Baſket-Bridge*, as ſhalbe here after diſcribed.

Moreouer, they haue three ſorts of other Bridges, namely, a ſmall *Boate-Bridge* with Beames Plancks, Roapes, and Anckors, which are carryed vpon long *Waggons* in the Armie, whereof you maye ſee one of them in this treatiſe Chapter the 3. Figure 10. of theſe wee haue commonly twelve, that goes along with our Armie vpon a long *Waggon*, drawne with 15. couple of horſes and a Thiller horſe.

Beſides, thoſe aboue mentioned, there are two great Bridges, the one called a *Punt-Bridge*, which is layd longwaies, end to end ouer the *Rhene*, or any other great River, and the other a *Maze Schip-Bridge*, as you ſhall ſee in the Figure following.

Command then being giuen to the Captaine of the Bridges and his men, for the firſt they lade Ordnance, and all manner of *Equipage* in thoſe great *Punts*, as Beames, Plancks, Cordags, Cables, Anckors, *Windlaſſes*, *Winches*, and al other neceſſaries, to bring thē vp to the *Rendevous*.

Now when the Captaine of the Bridg is to laye a great *Punt-Bridge* ouer the *Rhene*, or the *Whale*, as at *Nemegen*, *Schenckſconce*, *Weſell*, or at *Rhene-bergh*, takeing firſt the breath, and diſtance of the River from the one ſide to the other, they can eaſely give a geſſe, how many of theſe Punts being 50. foote long, and 10. foote broad, will ſerve to reach ouer the River. The firſt Punt then being layd longwaiſe from the edg of the one ſide of the River being faſtned to two great Stakes (and Anckers) driuen into the ground, they then lay at the furtheſt end of the firſt *Punt*, and other *Punt* laying Bruſh at both ends of the Punts, which riſes and falls, that horſe and waggons maye paſſe ouer them, and alwaies faſten and binde them together with Ropes, and Cables which ſtayes the Punts, by caſting out Anckors and Cables into the ſtreame, to hold them faſt together, and thus they doe till they haue layd ouer 15, or 16 of theſe long Punts, which will reach ouer from the one to the other ſide of the River, at the ende whereof there are caſt vp two *Halff-Moones*, (if it be not neere a Towne) and a *Steckado* or 2 Gats made, that none maye paſſe ouer it without leaue, having alwayes a gard to defend it and keepe it from burning.

Number 37. is the Figure of a peece of a *Baſket-Bridge*, ſuch a one as was vſed at our laſt Enterpriſe vpon *Hulſt*, made of *Wicker* about de biggneſſe of ones middle finger, with Supporters of wickers with in it, as hedges a foote diſtance one from an other, to ſtrengthen it, and helpe it from bending, when one goes ouer it, being alſo matted in the bottome and couered round about with waxed Canvas being carried betweene two men, with two *Coole Staves* ſome 13 foote long, as two men carries a *Hand-barrow*, being layd *Croſſewaies* peece to peece and faſtned together with roapes, and at both ends Anckors. The length whereof from A. to B. is 6½ foote, and the breath from C. to D. two foote and a half, and is a foote in heigth, ſo that two men in front maye goe ouer a Moate vpon any *Surpriſall of a Towne*.

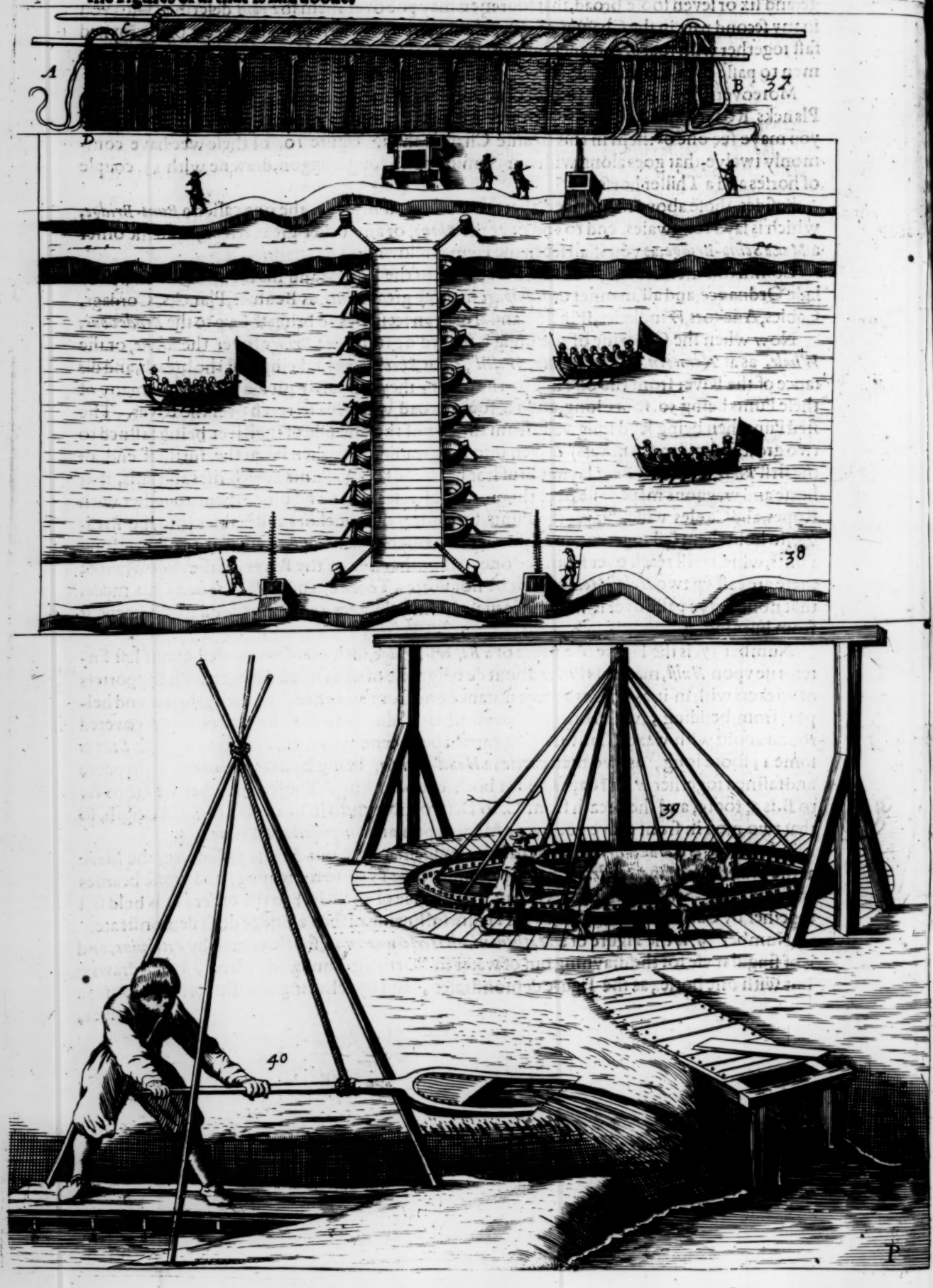
Number 38. is a *Maze-Bridge* layd croſſewaies, ſuch a one as our Armie paſſed ouer the Maze at the *Grave*, *Venlo*, and *Maſtricht*, having beames ſome 15 or 16 foote long, and croſſe beames ouer the Maze-Schips with Plancks from the one ſide of the River to the other, & is held faſt together by Cables and Anckors, as the Figure following of ſuch a Bridge doth demonſtrate.

Number 39. is the Figure of a *Mathematicall Horſe-watermill*, firſt inuented by *Vitrivius*, and is of ſingular vſe for the drayning out of water in Marriſh grounds, and places, being drawne but with one horſe, as the Figure demonſtrates, and by relieving it with freſh horſes and a

Driver,

Driver, maye goe night and day: the experience whereof wee saw at the seige of the *Bosch*, what abundance of water twentie of them drayned out of the overflowne Meddowes & the River of the *Dunmell*, which did helpe and further our Aproaches greatly.

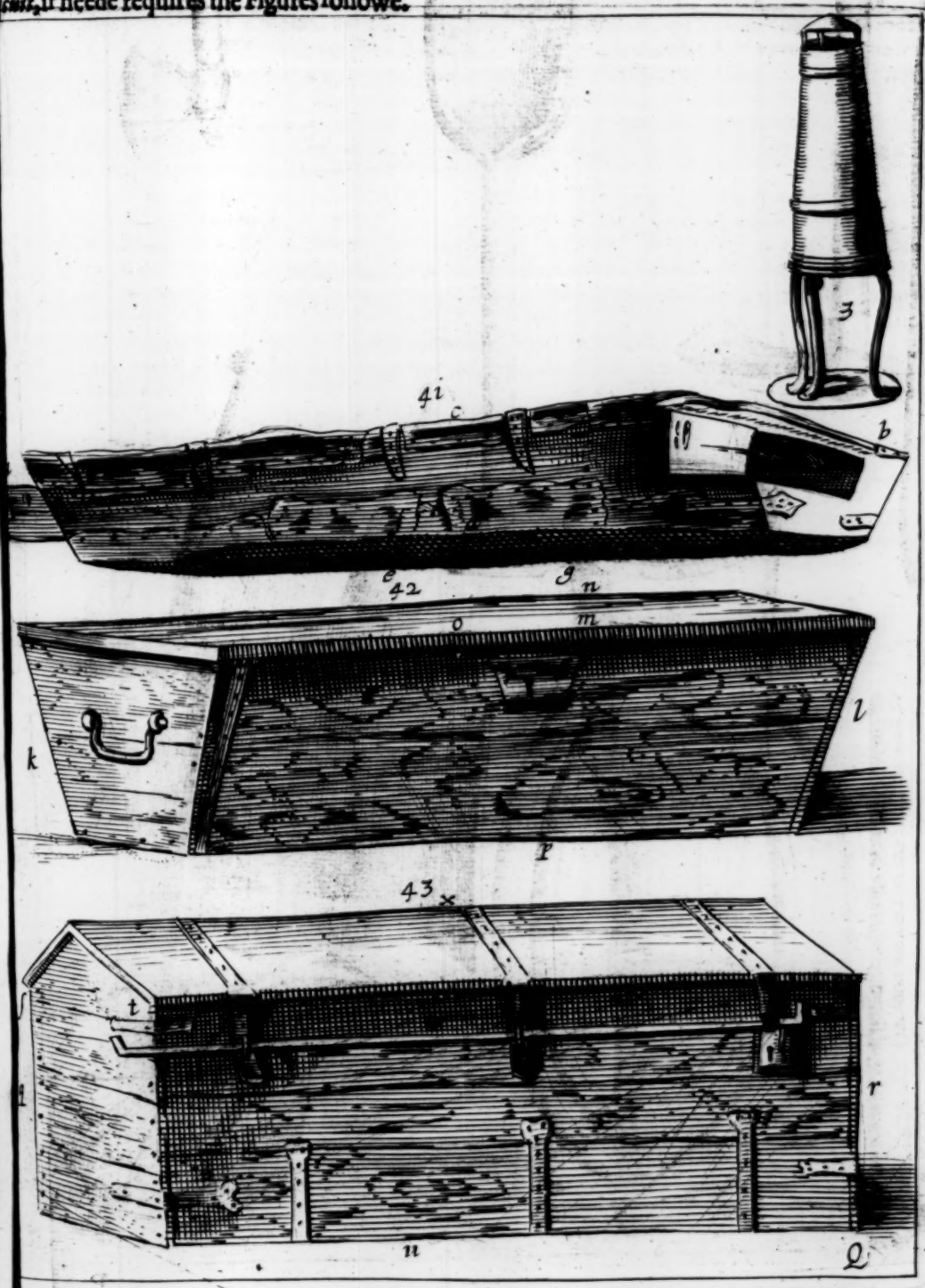
Number 40. is the Figure of a *Water-Scoupe*, made after this manner following, first you take three long *Pooles*, or Sparrs, and at the topp binde them together with a match or a Cord, frō the topp whereof discends an other Cord, which is bound fast to the hafft of the *Scoupe*, as you maye see, and the feete of the Sparrs, putt into the ground *Triangular* wise, with which yow see the Figure of a man casting water out of a *Moate* or a ditch. This Plate P. following will shew the Figures of al that is said aboue.



HE DEMONSTRATION OF A COPPER-OVEN, A KNEADING TROVGH and a Bread-Cheſt with the appurtenances there vnto belonging.

Vmber 41. is the Figure of a new invented *Copper-Oven*, ſett vpon three yron *Chimnies* for the bakeing of bread for an *Armie*, having at both ends two mouths or doores, which opēs shutts, whereof the length of one of them from A. to B. is nine foote longe, the bredth frō o D. is three foote, the heigth from E. to F. to the topp is a foote & a halfe, & the bottome n which the bread bakes marked G. H. is two foote & a halfe. This *Oven* (as is ſaid) ſtands n three yron Chimnies, noted 1. into which fuel and Turf is putt to heate this Oune, how y *Loafes*, & pounds of bread it will bake in three hours, the liſt following will show yow. Number 42. is the Figure of a *Kneading Trough*, which from K. to L. is ſeven foote longe, from M. to N. is two foote broad, the Ledge or couer O. is three foote high, and the bot- e P. is almoſt two foote broad, to this kneading Trough, yow muſt haue water *Pailes*, *Dow es*, *Peeles* to draw out the batches of bread, & all other neceſſaries belonging to a Baker.

umber 43. is the Figure of a *Bread-Cheſt* very vſefull in the warrs fot the carrying of *Bread Byſcuit* vpon a march, whereof the length from Q. to R. is eight foote longe, the bredth n S. to T. is foure foote longe, the heigth from V. to W. is three foote to the Cover, and oofe or Cover from *W.* to X. is likewiſe three foote high. This Bread-Cheſt being ſett vp gon, & drawne with three luſtie horſes, will carry a thouſand, yea 1200. pounds of bread ſcuit, if neede requires the Figures followe.



THE DEMONSTRATION OF MATERIALS, VSED IN OVR WARRES in the makeing of Trenches, Approches, Saps, & workes of Fortification as followeth.

Number 44. is a short *Plated Shovel* to worke in a Sapp or in a Gallerie.

Number 45. is a long *Plated Shovel*.

Numb. 46. is an *Iron Crow*, or a Goatsfoote.

Number 47. is a *Hatchitt* to cut wood with.

Number 48. is a *Mattock*.

Number 49. is a *Spade* with plated yron.

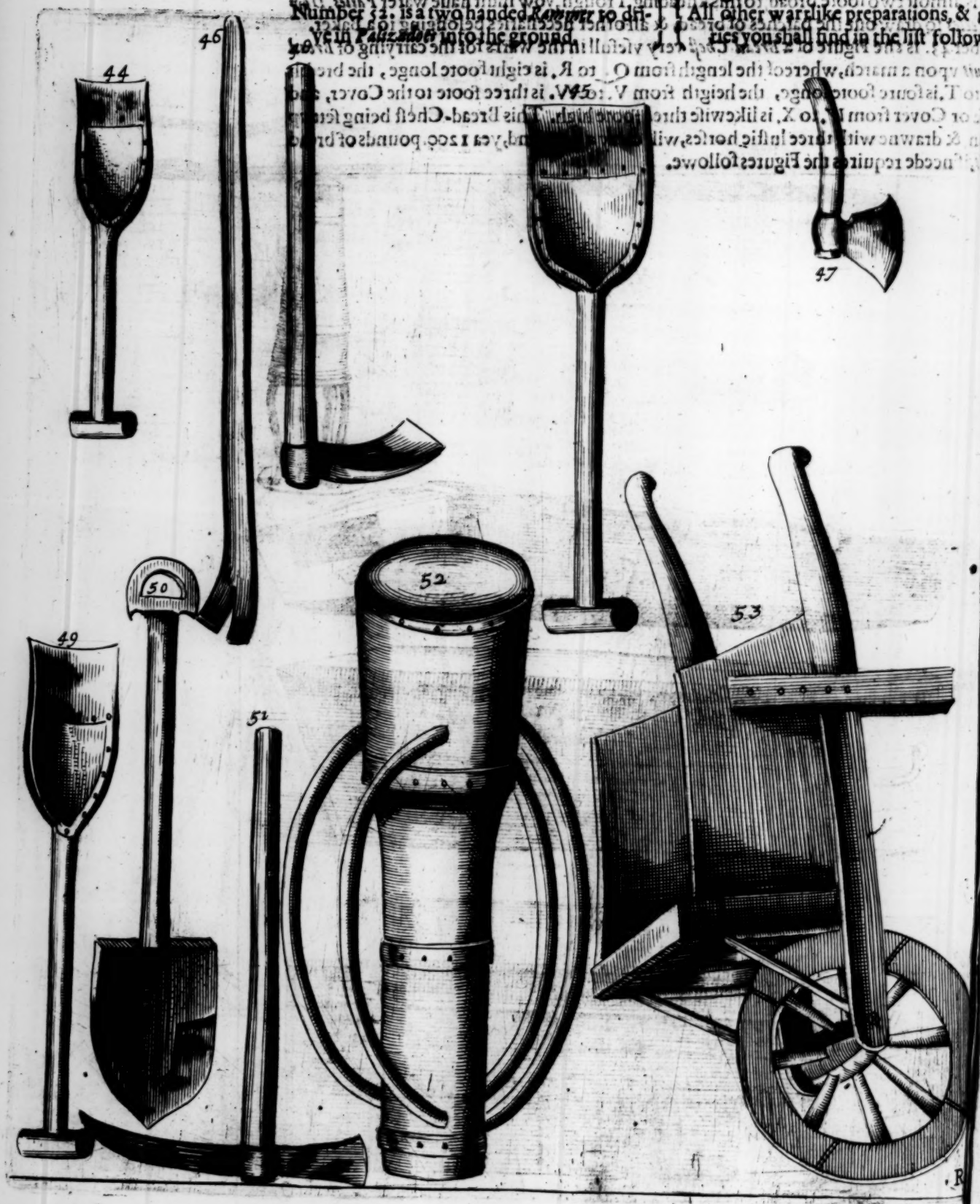
Number 50. is a *Sodd Spitter*.

Number 51. is a *Pickaxe*.

Number 52. is a two handed *Rammer* to drive in *Palizadoes* into the ground.

Numb. 53. is a *Wheele-Barrow* to carrie [illegible] & Sodds in for the makeing vp of wo[rks]. Palizadoes of two sorts you shall find in my second part in the Chapter of proaches Figure 166. And Frize-Ruyters or *Turne Pikes* in the same Chapter Figure 165. And foote a[nd] or *foote tanternailes* in the same Cha[pter] Figure 147.

All other warlike preparations, & nec[essa]ries you shall find in the list following.



The Office.

And charge of the Generall, *or* Master of the Ordnance,

and all other Officers subordinate *vnder his Traine of* Artillerie *Munition, and victuals, as the particular lists of all preparations, and necessaries belonging to an Armie shall be here demonstrated.*

THe Generall or Master of the Artillerie (as is showne in my second part of the chiefe officers of the feild pag. 9.) is a very honorable charge and hath command and super intendencie ouer all the ordnance, Armes, Munitions, Engines, Materials & Instruments for worke, yea, of all things belonging to the Ordnance, and hath also absolute Commaund ouer all Inferiour officers appartayning to the *Traine* of the Ordnance, as ouer the *Lieutenant* of the Ordnance, The *Controuler*, The *Clarke*, of the Amunition, and Materials, The Gentlemen of the Ordnance, and *Master Gumers*, Canoniers, Armores, Inginiers, The Captaines of the Pyoniers, and Mineurs, ouer all Smiths, Carpenters, and wheelewrights, ouer all Artificers, and Handie-crafts-men, and all such as doe attend vpon the traine of the Artillerie, Munition, and Materials. And when the Armie is to goe into the feild, he sends his warrants and patents out to all officers vnder his Charge, to meete him at the *Rendevous*.

Now for the better helpe, and discharging of his office, he hath a *Lieutenant* of the Ordnance allowed him, who in his absence hath absolute commaund also ouer this Traine, and is giuen him as an assistant, to helpe him in the execution of his Commands.

And becaus the Generall, or Master of the Ordnance, is commaunded in his Commission, and particular Instruction, to keepe a perfect account of all great, and small peeces of ordnance, equipages, Munitions, Materials &c. he hath allowed him a *Controuler* of the ordnance, which *Controuler* is obliged, and bound to keepe a pertinent list of all the peeces of ordnance great & small in the *Arsenals*, and *Magazines*, belonging to the Land, registring the weight of them, the Armes, and other things, that stand vpon them, as likewise what weight euery bullet is, which euery peece of ordnance doth shoote, who cast them, how they came to belong vnto the Land, moreouer, to keepe notice of all Carriages, wheeles, plated, or vnplated, yea off all things else belonging to the traine of the *Artillerie*, as maye appeare more at large in his Instruction.

Unto this Traine of the ordnance there are allowed two *Commisses*, or *Clarkes*, one for all things appertaining to the ordnance, The other ouer the Munition, Armes, Materials, Tooles, and ouer all other necessaris, belonging to the Armie, as shall appeare in the list following.

The *Councill of State*, having resolued for the feild, they send for the *Controuler* of the ordnance, and giues him a list of all necessaries belonging to the Canon, where of the *Controuler* deliuers a coppie of yt to the *Clarke* of the ordnance, who receiues charge to take on certaine Conductours to the number of some 40, that by their helpe and care, all things contayned in the list, maye be in good order taken out of the *Arsenals* and *Magazins* of the Land, and to see them well embarked, or putt vpon wagons to be brought with all expedition to the *Rendevous* appointed, and because the ordnance, munitions, and Materials maye be taken out of seuerall *Townes* and *Magazins*, he giues to euery *Conductour* his charge in writting, to lade such and such ordnance, Munition, & Materials, in those places as he is appointed which they are to shipp, and bring them vp to the place designed, as they will answere to the contrarie, if any thing should be lost.

A List, or Supposition.

What Ordnance, Munition, matterials, and other necessaries, are vsefull to be carried into the feild with an Armie, as followeth.

Imprimis for batteria 6. *whole Canons reinforced, &* 12 *Demy Canons reinforced,* 6 *long feild peeces, carrying a bullet of* 8 *lb. Weight,* 16 *short Demy Canon Drakes, of* 24 *lb. bullet,* 12 *quarter Canon Drakes of* 12 *lb. bullet,* 12 *short Drakes, or Sakers of* 6 *lb. bullet, &* 14 *small Drakes of* 3 *lb. bullet makeing in all*

For 6 *whole Canon spare Carriages,* 6 *for the* 14 *demy Canons reinforced, for the* 6 *feild peeces* 3 *for* 16 *demy Canon Drakes* 8 *for the quarter Canon Drakes* 6 *for*

the Faulconets, and saker drakes 12, facit in all 29.
Spare Ship Carriages for these severall peeces of Ordnance 20.
Spare wheeles proportionally for the Ordnance aboue specifyed of all sorts. 20.
Fore-waggons, or Carriages 80.
Spare wheeles for the fore carriages 12.
Block waggons & long waggons to lay, ordnance on, 25.
Spare fore and after wheeles 12.
Spare Thillers for the Block waggone 3.
Spare long waggons for the Block waggons 3.
Spare axeltrees, and draughts 3.
Sledges, to draw ordnance on 8.
Fearnes, or windlaces compleat 8.
Eshelletts, or martinets. 6.
Yron Crowes, or Goats feete, handspikes, and levers of all soorts. 20.
Brasse pullies, or truckles 20.
Winches, or the Endless screwes 12.
Yron bolts. 10.
Spare kanns of Salett oyle, for the Engines abouesaid 6.
Tarr, or grease boxses, 25.
Spare hoggs-grease for the carriages. 1300.
For every peece of these Ordnance abouesaid, three ladles, three Rammers, and 3 spunges a peece facit 240.
Spunge Copper nailes 1200.
Sheepe skinnes, to make spunges off 400.
Wooden levers for the Ordnance 50.
Yron Crowes 20.
For 6 whole Canons bullets of 48 lb. 2000.
For 14 demy Canons, bullets of 24 lb. 3000.
For 6 feild peeces, or demy culvering of 12 lb. 1500.
For 16 Faulconets of 6 lb. bullet 1000.
For the Demy Canon drakes of 24 lb. 2500.
For the quarter Canon drakes of 12 lb. 2100.
For the Sakers of 6 lb. bullet 2100.
For the small drakes of 3 lb. bullet 2200.
The Gabions, and Canon bass ketts, are made in the Feild, some 6, or 6 ¼ foote high, and 3 foote in dyamiter, and costs 18 sts. a peece Latton, Boxses for the cartredge shoot for every peece 100, facit in all 4000
Powder for these 80 peeces of ordnance 400000 lb.
Match in Bundles 300000.
Pouch-Barrils for the charging of ordnance with each a wodden hammer, and his dish 80.
Haire-cloaths 100.
Hurdles to plant ordnance on wich are stiff 500.
Hand Barrowes 50.
Musket Baskets of all soorts. 1200.
Wooden hookes 20.
Thiller Harnase compleate 150.
Spare roapes & other harnase. 150.
Plated crosse staues for the drawing roapes after every couple of horses 189.
Whip eord to binde with all 1000 paire.
Horse collars. 800.
Drawing roapes of 40 fadome a peece 30.
Half drawing roapes 30.
Steering-roapes 60.
Windlasse Roapes 8.

Strycking roapes 8.
Drawing lines 70.
Neck-lines to drawe vp shipping, or vse full about ordnance 40.
Ramming blocks to driue in piles, in the ground 12.
Small Rammers to driue in piles 10.
Spare roapes 12.
Great Yron hammers 7.
Beames, and vnderlayers for plat-formes, and other vses. 10. foote longe 500.
Planckes for bedding & other vses 4000.
Sparres 6000.
Spades 1000.
Showells 2000.
Axses 500.
Hatches 500.
Hand billes 500.
Pick axses 300.
Mattocks 300.
Yron hammers for the Greacers of ordnance 12.
Lanternes 30 lb.
Candles 300.
Frie-lights to putt in pitcht roapes 20.
Leather pailes to quench frie with all 30.
Canvas peeces, to make blinds with 30.
Pack thred 20.
Saile yarne 4 lb.
Firkins of round pitcht roapes 12.
Bolts, and clenchers for the Axeltrees of Carriages, and the Block-waggons 60.
Bolts for the Thiller carriages 60.
Bolts and clenchers for the long waggons 60.
After hookes for the carriages 10.
After Nailes 50.
Spare clenchers and wedges for the ordnance 40.
Wedges for the block and long waggons 160.
Small sheires, with bolts and rings 100.
Shieres with chaines 30.
Nailes for the bolts 150.
Great yron Nailes 150.
Yron Staples 100.
Latton Boxses with cartriedge shoot 1000.
Towe of diverse sorts, 100 lb.
Bundles of roapes and Cordage 10.
Nailes 8 ynches long 600.
Nailes 7 ynches long 2000.
Nailes 6 ynches long 6000.
Nailes 5 ynches long 12000.
Double sized nailes 20000.
Single sized nailes 20000.
Small nailes, and lath nailes of all sorts 20000.
Bundles of barre yron 400 lb.
Plate yron, and small barres for smiths 3000 lb.
Of staue steele 1000 lb.
Item all smiths Tooles, and vtensiles.
All Carpenters Tooles, as many as shalbe need fall.
Two great Morters, mounted vpon their Carriages.
One small Morter for each 100 granades of 160 lb. for the great, and 100 granadoes of 20 lb. for the lesser.
Hand-granadoes to cast into saps, trenches, and worker.

A list of some other
Materials, and necessaires, which the Clarke of the Materials vses to carrie with him to the Feild, to make a *Magazine* of in the Army as followeth.

Powder for Muskettiers	500000 *lb.*
Match in Bundles	80000.
Sow-lead to cast muskett bullets with	50000.
Moulds of 12 bullets a peece to cast in	50.
Haire-cloaths to cover the powder with	60.
A Great many of old peeces of sailes to make blinds with	1000.
Spare Musketts	500.
Spare Musket rests	1000.
Spare Bandeliers	500.
Spare muskett stockes	300.
Pikes 16 foote long besides the head	2000.
Half-Pikes with Loop staus-feete	300.
Corslets, and Head peeces	300.
Armors of proofe with Caskets of proofe	100.
Iavelines double pointed, with yron to putt through the trees of Turnepikes	1500.
Match-Hornes to blinde light matches vpon an enterprize	3000.
Running waggons with two wheeles, and Iavelins put through the Axeltres	300.
Short Palissadoes *to driwe into the ground with long tanter nailes*	6000.
Yron hammers to strick the nailes in	50.
Wodden hammers to break open the barrils of powder	200.
Great Boorers to boore holes with	9.
Twelue firkins of foote angles, or foure square tanter nailes	12000.
Yce spurrs with lachets.	6000.
Peeces of Bulrush bridges for an Enterprise to passe ouer a moate, or ditch	150 *peeces.*
Hand-barrowes to carry sodds with	150.
Shippers hookes short and long	150.
Long yron rakes with 3 or foure teeth	150.
Great Beetles	100.
Water scupps	200,
Mathematicall water horse miles, to drayne out water, se figure 37	3.
Spiters to spit sodds with all	300.
Bagger Netts to worke in a gallery	25.
Crooked yron Showels, with long hafts to worke in a Gallery	12.
Spades	10000.
Showells plated	2000.
Mattocks	1000.
Pick axses	600.
Great yron hammers to breake stone walles with	100.
Axses of all sorts	1200,
Hatchets and hand bills	100.
Great Pincers	8.
Great and small hammers	28.
Yron crowes of all sorts	30.
Draggs	25.
Nailes both greate and small enento lath nailes of all sorts	200000.
Lanterns and blinde lanterns of all sorts	40.
Candles	400 *lb.*
Torches	50.
Fire-lights 25 and pitch roapes	600 *peeces.*
Barrils of pitch	6.
Barrils of Tarre	4.
Woll-sacks	200.
Howerglasses	50.
Vntempered chaulk in barrils	*a last.*
Ship-Katroles of all sorts	220 *single.*
Double Ship Katroles	70.
Drawing lines to draw Shipping against the streame	60.
Baggs to fill earth withall vpon an Approah	2000.
Ammunition chests to put them in	6.
Blinds of Kanvas 150 foote long each peece	200.
Plancks, Sparrs, beames of all sorts good store for ordnance, palisadoes, galleries, and other workes, some shorter, and some longer as occasion maye serue.	
Great block pile-driuers, with all their roapes, and appurtenances	2.
Tow-handed Rammers for two men to driue in palissadoes with	20.
50 peeces of bulrush bridges, couvered ouer with Kanvas, with their ropes, & coards to fasten them one to an other and ankors each peeces being 10 foote long, & 6 foote broad, Corke bridges *each bridg contayning 10 peeces ioyned together, & each 10 foote long*	2.
Cordage of all soorts	400 *lb.*
Windlases or winches	2.
Leather pailes to quench fire with	300.
Handsawes, two handed sawes, and great timber sawes	250.
Augers of all sorts, wimbles, & Adases	50.
Good store of Carpenters tooles.	
All things necessarie for 100 Karres, to carry earth in compleate wheele Barrowes	2000.
Spare wheelss and yron pians for them	500.
Single sawne planckes for the wheele barrowes	200.
Quarter staues, or great Beacons to lay out the quarters with all with flaggs	100.
Haspels, and Turne pikes, with their Iavelins small and great	100.

By this List abouesaid, one maye eassely vnderstand, what Munitions, Materials, and necessaries are ned full to be carryed into an Armie, of all which the Clarks of the Amunition, aud the Materials shall deliuer them out by the helpe of their Conductors, as the occasion of the maye seruice require, and also receines them into their Custodie againe.

The

The Waggon Maſter Generall, his Lieutenant, and Conductours march vnder the Traine of the Ordnance.

BEfore the Armie riſes to the Feild, the Lord Generall ſends out writs for the Waggon Maſter Generall, that he ſhall ſend for his Conductours, to preſſe and take, vp ſoe many waggons, as the greatneſſe, or litleneſs of the army maye require, it maye be in every quarter 6, 7, 8. yea, 1000. waggons, and each waggon to be furnished with thre luſty horſes, and a dryver, enery weggon having 3. gildets a day, ſo long as the Armie is in the Feild, and the Conductours 30. ſtivers *per diem.*

A Liſt of the Waggons to beemployed as followed.

FIrſt for the Generall of the ordnance his traine 150.
For the Lord Generall him ſelf, as many as his traine ſhall require.
For princes Earles, and Lords voluntiers as many as they ſhall have vſe for.
For the Lords the Deputed States for the Armie as many as they have vſe for.
For the Clarke of the Munition, and his traine Including alſo the Controuler, Inginiers and Conductour two compaines of Pyoniers, and the Carpenters 120.
For the Sariant Majour Generall of the armie 2.
For the Commiſſe or Klark of the Victuals and his traine 320.
For the quarter-maſter generall of the foote 2.
For the provoſt marſhall Generall 3.
For the three principall Chirurgians of the army 3.
For the Treaſurer of the armie 3.
For the Waggon-Maſter Generall his Lieutenant, Conductours, Wheele-makers, Smiths, & Tow-workes 7.
For the qurter-Maſter of the Horſe 1.
For the Lieutenant Generall of the Horſe 6.
For euery Colonell of the foote ſome 3. ſome 4. according to the greatneſſe of their traine, A Lieutenant Colonell 1.
For every Sariant Majour 1.
For every quarter-Maſter of the foote 1.
For the Preacher of a Regiment 1.
For the Chirurgian & Provoſt of a foote Regiment 1.
For every foote Companie in the Armie 1.
The Bridgmaſter hath under his charge all ſorts of punt bridges & ſmall boate bridges: the ordnance and all things elſe carried vp to the Rendevous in punts.
The Commiſſe Generall or Clarke of the ſhipping When the Armie is to goe into feild is to ſend forth two Conductours to preſſe ſo manye Ships in every Towne and quarter, as the Generall ſhall give him order for, and as the greatneſſe of the Armie maye require.

A Liſt of the Baggage Shipps, and for all Officers that followes the Army.

FOr every Colonell and the chiefe Officers of his Regiment Ships 3.
For every three troupes of horſſe 1.
For the Lord Generall and his traine 21.
For the Lord Marſhall 5.
For forrain Lords and Earles 28.
The Quartter-maſter & the Provoſt goe in the Ship appointed for the Officers of the feild
For each Captaine of the Pyonniers a Ship 3.
For the Treaſuier of the Army 1.
For the Advocate Fiſcall & his Recorder 1.
For the chiefe Maſter Gunner 1.
For the Captaines of the carpenters 2.
For the Provoſt Marſhall Generall 1.
For the Generall of the ordnance 1.
For the Klarke of the Ammunition 1.
For the Klark of the Ordnance 1.
For the Klarke of the Victuals 1.
The Waggon-Maſter Generall 1.
The Captaine of the Kanon Horſes 1.
The Commiſſe or Clark of the Shipping 2.
The Sariant Majour Generall of the Army 1.
The Quarter-Maſter Generall 1.
The Controuler of the Artillerie & Munition 1.
The Controuler of the Fortifications 1.
The Inginiers, and their Aſſiſtants 1.
The Provoſt Marſhall ouer the Shippers, and ſaylours 1.
Ships allowed for the tranſporting of ſick and Wounded ſouldiers 20.
Spare Ships for forraine Lords and Voluntiers 10.
For the Provoſt Marſhall Generall of the Cavallerie 1.
For the Phyſician and Apothecarye of the Armie 1.
Beſides all theſe every Companie ſo long as they lye a Ship board have three, foure, or five Ships comming out of garriſon till they march a land, Where of ſome of theſe Ships have three gilders, ſome a rixe dalder, others two gilders a day, according to their burden.
The Commiſſe or Clark Generall ouer the Victuals, hath ſuperentendence and care ouer all manner of Victuals, as alſo victuallers and Sutlars, Which followes the Armie, and hath under his charge diverſe Conductours, and Bakers as the ſervice maye require.
Firſt if it be a long expedition, ſo that noe bread or Victualls can come vp to the Army from the Shipping by convey, or

to my

to any towne beſeiged it Wilbe needfull for him to have meale barriled vp 156 lb. in a barrill 3000 barrils
Which 3000. Barrils Will require 600 Waggons.
For the keeping of it in Shipping before it be loaded on Waggons he muſt have 5. Conductours, and Ships 9.
All neceſſaries muſt be have alſo be longing to Bakers, and Bakers 72.
As alſo 40. Kopper Ovens ſuch as yow ſee figure 47. each oven carryed vpon a waggon, Troughs, dow knifs, pailes, &
For theſe 40. Kopper Ovens ſixe great kitchin tents, With two or three chimneies in them.

Now one Oven being 9 foote longe, and 2 ½ in breath, Will bake in three howers a batch of 50. long loaves of bread, each loafe a foote long, & 5. ynches bread, Which bakes at a time, 300 lb. of bread, and one Oven Will bake in 24. howers 300. loaues of bread, Which makes 1800 lb.
And 40. of theſe ounes being Well heated, Will backe 6. times in 24. howers, 12000, loaves, Which at 4 lb. each loafe, comes for one day to 48000 lb. and for two dayes if the Armie reſts 96000 lb. a reaſonable proportion of bread 960000 lb.
Item chieſe for the Army in ſtore 500000 lb.

The Demonſtration for the Quartering of the Generall, or *Maſter of the Ordnance*, and all Subordinate Officers marching vnder the Traine of the Artillerie.

First this Quarter is in breadth, or Front *from A. to B.* 600. *foote, and from B, to C. is* 300. *foote in Depth, Which never takes vp any more ground in Depth, but onely the Ordinary meaſure, for all the ſtreets in yt, are but* 20. *foote broade, and are marked D. E, & is the* Parke *or* empalement *of the Generall of the Ordnance his ground, With his* Attendants, *men, and* Horſes, *as you maye evidently ſee in the raized Figure:*

Num. 1 *is here a* Parke *or a ſquare of* 100. *foote: In Which parke his Tents, and Meaſures are ſett vp as the firſt is as followeth, a Hall or place of* 12. *foote in ſquare, and a Gallerie beyound that, and the great Hall of* 6 *foote long, and* 6 *foote broade. The great Hall or dyning roome is* 24 *foote broade, and* 12 *foote deepe. The two* Pavillions *are* 12 *foote ſquare. The Gallerie reaching from the one* Pavillion *to the other is* 20 *foote long, and* 6 *foote broade. The Gallerie from the great Hall to the gallerie of the two Pavillions is* 10 *foote lang, and* 6 *foote broade. The* Curtaines *of the Tents are all of them ſixe foote deepe, and the two firſt* pavillions *are likewiſe* 12 *foote ſquare, and the* Kitchin *is* 24 *foote long, and* 12 *foote broade.*

F. is the parke, *or quarter of the Lieutenant Generall of the Artillerie, and for the* Maſter Gnnners, *and* Gentlemen *of the Ordnance, their ſervants, & Horſes, Which park is* 100 *foote broade, and* 40 *foote in depth. The Tents of the Lieut. Generall, are of this Meaſure followeing. The great Hall is* 16 *foote in depth, &c.* 10 *foote broade. The Gallerie* 6 *foote long, &* 6 *foote broade. The* Pavillions *are* 8 *foote in ſquare.*

G. is the parke for the Matterials of Amunition, as ſpades, showelles, Hatches, Billes. Axees, Pickaxſes, Mattocks, planckes, beddings for Ordnances, beames, wheele barrowes, and diverſe other things. This parke is 140 *foote in depth &* 130 *foote broad.*

Number 5. *is the Hutt, or a Tent for the* Clarke *of the Matterials.*

Number 6. *is a Hutt, into Which all things are layd, Which muſt not take wett. As Match, candles, and other things.*

Number 7. *is a Common* Kitchin *for all the* Conductours, *to dreſſe their Victuals in, & made there to keepe the quarter from fyring.*

Number 8. *are the* Conductours *Hutts, ſome* 8, *or* 10. *foote in ſquare.*

H. Is the parke into Which are layd, all the materials, inſtruments, & tooles belonging to the Ordnance, as alſo anckours. powder, and bullets & diverſe other things, Which parke is 140 *foote in depth, and* 130 *foote in bredth.*

Number 1. *is the tent, or hutt of the Clark of the Ordnance.*

Number 2. *is a hutt With all manner of* Amunition, *belonging to the Ordnance, Which ought not to receive Wett.*

Number 3. *is the Common* Kitchin.

Number 4. *is a Cave, or Sellar to laye in Gun-powder.*

Number 8. *are Hutts for the Conductours of the Traine.*

I. Is the park or quarter for the Maſter Gunners, or Gentlemen of the Ordnance the ordinarie Gunners, & Canoniers, Whoſe depth is 70 *foote, &* 40 *foote broade.*

K. Is the Parke or lodging of the Maſter of the fire Workes, With his Conductours, & men, Whoſe parke likewiſe is 70 *foote in depth, &* 40 *foote in breath.*

L. is the parke, or quarter of the Petardiers, *and their men, Which is alſo* 70 *foote in depth, &* 40 *foote in breath.*

M. is the parke of the Maſter of the Batteries, & his men of the ſame greatneſſe.

N. are three tents, or hutts for the Captaines of the Saylours, & mariners to attend vpon the Ordnance, the Artilralls, & drawing harneſſes for the Ordnance and for the Mineurs.

O. are all hutts 8 foote in ſquare, each for two Saylours, and two Mineurs, The ſtreetes alſo betweene every rod of hutts is 8 foote broade.

Their quarter is 140 foote in depth & 90 foote in breath.

P. is the parke, or quarter of the Clarke of the Fortifications, and his Conductours, being 60 foote in ſquare.

Q. is the parke and quarter of the Inginiers, & their Conductours, being 80 foote in depth, and 60 foote in breath.

R. is the quarter-maſter of this traine his quarter, or lodging being 60 foote in ſquare.

S. is the parke or quarter of the Captaine of the Canon, or drawing Horſes, and his Conductours, being alſo 80 foote in depth, and 60 foote in breath.

T. is the quarter, or parke for the makers of Gabions, or Canon bas ketts, & Muſket baſkets, being 40 foote in bredth & 60 foote in depth.

V. is the Armourers parke, and the quarter for the Generall of the Ordnance, with their Workemen. Farriers, and Smiths, belonging to this Traine, being 60 foote in depth, and 30 foote in bredth.

W. is the Chiurgians parke of this Traine, 60 foote in depth, and 20 foote broad.

X. is the Provoſt Marſhall of this Traine, 60 foote in depth, & 30 foote broade.

Y. is the Farriers, or Maſter Smith his parke 80 foote in depth, & 25 foote in bredth.

Z. is the Carters or Waggon mens and labourers, 80 foote deepe, and 35 foote broade.

& is the Coopers parke 80 foote in depth, & 25 foote in breath.

& b is three Hutts or Tents for the three Captaines of the Pionniers, *a*, are the Hutts of the Pionniers with their Lieutenants, whoſe hutts, are in the front of the rodes, and each Hutt is 8 foote in ſquare, whoſe parke is 90 foote in breath, & 140 foote in depth.

6, is the parke, where in is ſett the carriages of Waggons, and drawing Horſes for the Ordnance, which is to be vnderſtood ſuch as are to paſſe vpon the Watch, and Canon for any ſuddaine peece of ſervice, and to thend, the horſes maye not be then to ſeeke. The two Hutts with in the parke marked 9 are for the Conductours & Waggon Men. This parke is 140 foote in depth, & 80 foote in breath.

The Geometricall modell of a quarter for the Artillerie followes.

And the Orthographie in perſpective of the modell for the traine of the Ordnance, Yow maye ſee here lively demonſtrated in the Which & Figure thereof following.

Finis Coronat Opus.